Back from the brink
Former UN climate chief **Yvo De Boer** reflects on Cancun. *Page 12*


Financing renewables
Amplio's **Riccardo Segat** gives *TEIT* the low-down on the financial challenges facing renewables. *Page 14*

Final Word
Are the UK's proposed reforms too tangled a web? *Page 16*

January 2011 • Volume 3 • No 11 • Published monthly • ISSN 1757-7365 www.teitimes.com

# THE ENERGY INDUSTRY TIMES

## IN BRIEF

**US launches export initiative**
Stimulating clean tech exports will help the US to shore up its renewable energy sector until long-term energy policy is firmly in place.
*Page 4*

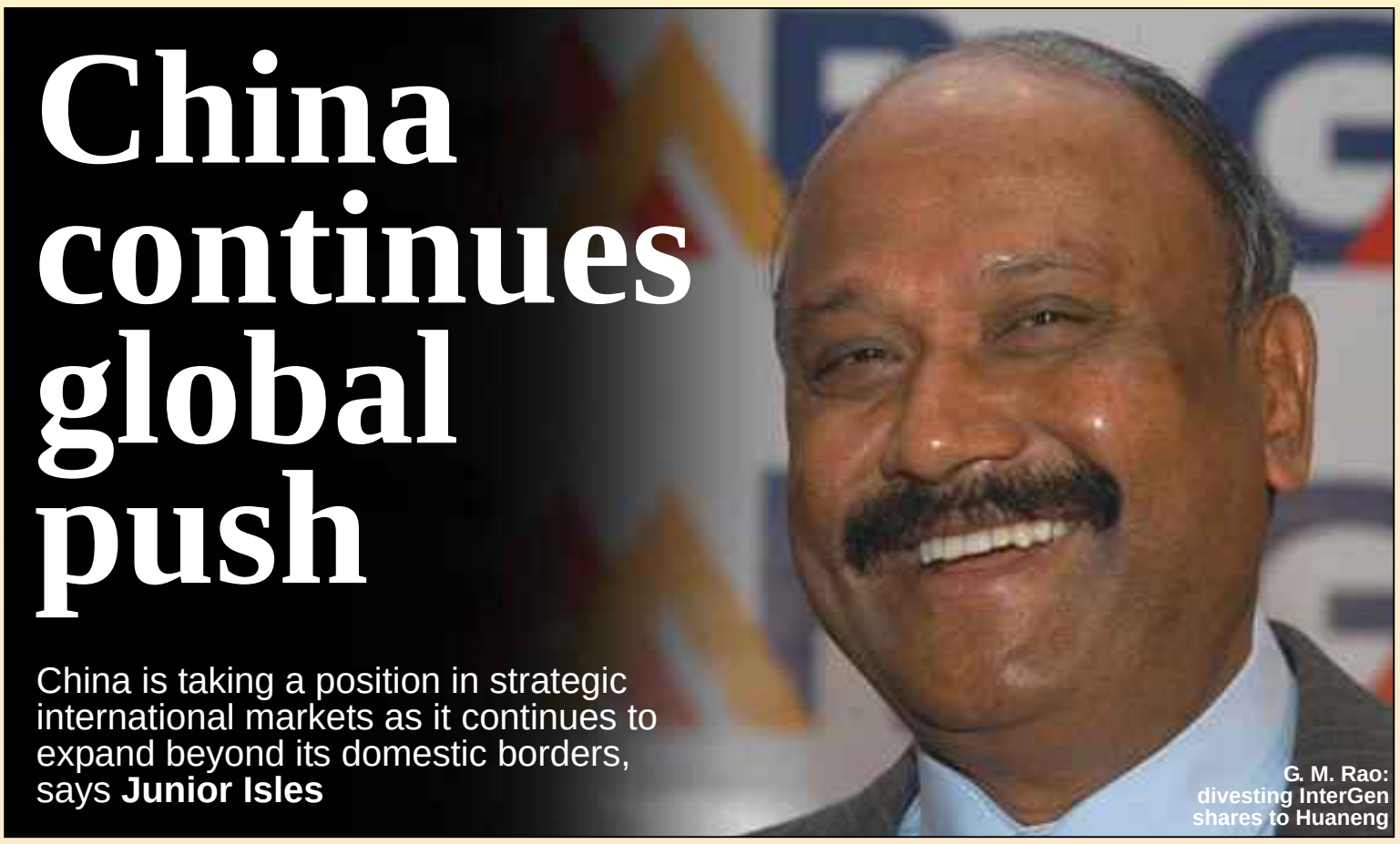
**Europe backtracks on coal mines**
Funding for renewable energy projects is drying up, but the European Commission is considering plans to extend subsidies for coal mines.
*Page 8*

**Jordan revises nuclear plans**
Bidders participating in the tender for the construction of Jordan's first nuclear power plant have been asked to submit revised bids.
*Page 9*

**Technology: Titan of the sea**
The use of superconductors looks set to push the size of wind turbines to 10 MW within the next two to three years.
*Page 15*



# China continues global push



China is taking a position in strategic international markets as it continues to expand beyond its domestic borders, says **Junior Isles**

G. M. Rao: divesting InterGen shares to Huaneng

Recent strategic overseas investments by Chinese companies are beginning to position China as a major player in the global energy market.

In December China's State Grid, one of the world's largest utility companies, announced that it would invest $989 million in seven Brazilian power transmission groups. The deal marks State Grid's first venture outside Asia. Its first venture abroad in 2007 saw it invest $4 billion in the Philippines' power system.

State Grid's Brazilian investment will see it operate more than 3000 km of transmission lines under a 30-year licence, with an option to extend for another 20 years.

State Grid is the major player in its home market but says that the returns from its Brazilian venture will be notably higher than at home, where the company is heavily regulated. The Brazilian assets will earn revenues of $110 million a year. The company had total assets in 2009 of $293.2 billion but profits were just $678 million.

Brazil is an important market for China. Its investments in the country in 2010 were expected to reach $10 billion.

In statement on its website, State Grid and other Chinese companies lauded the company's "go abroad" strategy. "China and Brazil are both 'Bric' countries, and their energy needs are growing quickly along with their economies…bilateral cooperation in the power sector has great potential."

Speaking to the *Financial Times*, Brett King, partner at Paul, Hastings, Janofsky and Walker, which specialises in power deals, said: "The Chinese are becoming more aggressive in making overseas acquisitions and in future they will be major players in the international power sector."

At the end of November one of China's large state-owned power generators China Huaneng Group said it would spend $1.232 billion for a 50 per cent stake of US-based power

*Continued on page 2*



THE ENERGY INDUSTRY TIMES is published by Man in Black Media — www.mibmedia.com — Editor-in-Chief: Junior Isles — Creative Director: Jerome Hinds — For all enquiries email: enquiries@teitimes.com

(Continued from page 1)

generation firm InterGen N.V. from Indian infrastructure developer GMR Group.

GMR said the purchase of assets will help China Huaneng tap power generating assets in the UK, the Netherlands, Mexico, the Philippines and Australia with overall gross operational capacity of 8148 MW. InterGen has 12 power plants in several countries around the world.

GMR said the transaction requires customary regulatory approvals from the countries in question as well as China, and is expected to conclude the deal in the first half of this year.

G. M. Rao, chairman of GMR Group, said the decision to divest shares in InterGen falls in line with company strategy to focus on the Indian market and GMR Group could hence deploy more capital and management resources on domestic investments.

China's leadership in renewables is also increasing its potential to become a major player in the international renewable energy sector.

A senior official at China's National Energy Administration (NEA) recently encouraged Chinese firms to invest in the US renewable energy market to boost their competitiveness in the international market.

The statement was made by Wang Jun, head of the department of new energy and renewable energy at the NEA, during the wind power session at the December China-US Renewable Energy Investment Forum, also attended by officials from the US Department of Energy and the Department of Commerce.

"While a number of US companies are establishing firms manufacturing wind turbines, bearings and current converters, thus making China an important part of their global business, the US wind power market remains relatively unknown to Chinese firms," said Wang.

He noted that the US wind power market has great potential but is short of funding in the wake of the international financial crisis. However, there are opportunities for many Chinese wind power enterprises with good expertise and the ability to provide funding.

China's progress in solar power development and its ability to manufacture panels at low cost will also present opportunities.

In late November, the first photovoltaic plant invested and built by Chinese companies in Bulgaria was officially opened.

The 2 MW photovoltaic plant, based on unique Chinese technology, is located on a mountain near Ihtiman, 40 km south of the Bulgarian capital Sofia. Chinese companies Polar Photovoltaics and Wiscom, which invested $7 million, and their local construction partner SunSERVICE, built the plant in seven months.

Ge Ning, chairman of the board of directors of Wiscom, said the company would seek more investments in solar energy in Bulgaria.



# UK attempts to create certainty for investors

In what is being described as the biggest shake-up since privatisation 20 years ago, the UK government is proposing electricity sector reforms that it hopes will create the certainty needed for investment in low carbon generation. **Junior Isles**

Chris Huhne: Energy and Climate Change Secretary

The UK's coalition government is proposing sweeping reforms to its electricity sector in an attempt to attract investment in low carbon power generation sources, including nuclear.

Details for the reforms are set out in two consultation documents, one on electricity market reform by the Department of Energy and Climate Change (DECC) and one on the carbon price floor, by the Treasury. The consultations are set to last until spring when recommendations will be published in an energy White Paper.

Around a third of the UK's greenhouse gas (GHG) emissions come from electricity generation, but this is set to rise as demand increases from new generations of electric trains and cars. This is compounded by the need to overhaul the country's energy infrastructure, which regulator Ofgem estimates could cost around £200 billion over the next decade.

To combat the growth in GHG emissions, the UK government has ambitions to increase the proportion of electricity coming from renewable sources from 7 per cent to 30 per cent by 2020. At the same time it needs to have sufficient capacity to ensure electricity supply when the wind does not blow.

Energy and Climate Change Secretary Chris Huhne said: "More than £110 billion [$171 billion] of investment is needed in new power stations and grid upgrades over the next decade, that's double the rate of the last ten years. Put simply, the current market is not fit to deliver this."

The proposed shake-up includes:

- A carbon price support mechanism, using the Climate Change Levy (CCL) and fuel duties to tax fossil fuels used to generate electricity at rates based on their carbon content.
- Establishing a long-term 'contract for difference' for low carbon power generation, including nuclear. This feed-in tariff would see generators receive top-up payments if wholesale power prices are low, but money would be 'clawed back' once the cost of low-carbon electricity generation drops below wholesale prices. However, the consultation also sets out an alternative 'premium' feed-in tariff.
- Incentives for demand-reduction measures and to construct back-up power plants.
- An emissions performance standard, which would ensure no coal plants can be built without carbon capture and storage.

The proposals could help provide much needed investment in the UK carbon capture and storage (CCS) programme, which last month suffered a blow with the news that Powerfuel has gone into administration. The company was hoping to be the first to develop a commercial scale clean coal plant with CCS but was crippled by the cost of the project.

Jeff Chapman, London-based chief executive of the CCS Association, expressed disappointment at Powerfuel's funding woes, but argued the Hatfield CCS project remains "a good project" and that electricity reform, such as premiums for low-carbon power generation, will boost the sector.

"…As always, though, the devil will be in the detail and the government must ensure they push this through at speed and not get derailed."

The range of incentives is welcome news for an industry that has failed to invest in badly needed infrastructure for over a decade, leaving the country with a looming energy gap.

Reacting to the electricity market reform plans James Cameron, Vice Chairman of Climate Change Capital said: "The electricity market reform proposals, in particular the long-term fixed price contracts for low carbon electricity, could provide much needed certainty for investors over the right time-horizons. Together with effective carbon pricing, this package could finally make clean, green technologies permanently more attractive to investors than conventional polluting ones.

"Huge amounts of private capital are required to deliver Britain's transition to a low carbon economy and this package can help provide confidence for investors. As always, though, the devil will be in the detail and the government must ensure they push this through at speed and not get derailed."

Meanwhile David Porter, Chief Executive of the UK Association of Electricity Producers commented: "The industry has been waiting anxiously for this consultation because the outcome will determine whether or not we get sufficient investment to deliver a low carbon power industry. Politicians and the regulator seem to recognise that the huge cost of doing this will push up customers' bills. Everyone involved has to be candid about that." Just prior to the unveiling of the market reform proposals, the government also announced changes to the Renewables Obligation (RO), the main mechanism for boosting renewable generation in the UK.

Industry will now get an indication of the support they will receive for new large-scale projects, such as wind farms, that start generating renewable electricity from April 2013, as early as mid-July 2011. Under previous arrangements, support levels were not due to be finalised until autumn 2012. This timetable was making developers reluctant to start projects with long construction periods, the government said.

DECC said it would consult on new RO banding proposals in summer 2011 and confirm the new bands by autumn 2011.

# Cancún restores credibility

Christiana Figueres, executive secretary of the UNFCCC: the beacon of hope has been reignited

Unlike Copenhagen 12 months earlier, UN climate change talks in Cancún made tangible progress in putting multilateral negotiations back on track.

A number of agreements were reached, notably on plans to launch a $100 billion Green Climate Fund to finance mitigation and adaptation in developing countries, a framework for monitoring, reporting and verifying (MRV) emission reductions, and on principles for reducing emissions from deforestation and forest degradation (REDD).

The agreements reached in Cancún formalised the accord reached at Copenhagen, when developed and developing countries agreed for the first time to curb their greenhouse gas emissions. However, the refusal of a handful of countries to sign up meant the Copenhagen Accord could not be formally adopted. At Cancun, only Bolivia continued to refuse but was sidelined. This means that the emissions reduction targets set out in Copenhagen can now be formally recognised within the UN negotiating process.

Countries will now continue to work towards agreement on other elements, such as the legal form a new deal could take, and the future of the Kyoto Protocol, which expires in 2012.

Christiana Figueres, the executive secretary of the UN Framework Convention on Climate Change (UNFCCC) said: "Cancún has done its job – the beacon of hope has been reignited, and faith in the multilateral climate change process to deliver results has been restored."

*Industry Perspective, Page 12*

## Brussels to get tough on market abuse

EU energy commissioner Guenther Oettinger has proposed giving the European Agency for the Cooperation of Energy Regulators (ACER) new powers to investigate cases of abuse in the gas and electricity markets.

The market has grown five times in volume over the last 10 years since liberalisation but three quarters of trading is outside established exchanges. Mr Oettinger is concerned this could lead to market abuses by hedge funds and other traders that would result in higher prices for the consumer.

"It is crucial to ensure EU-level comprehensive rules which guarantee that citizens can be confident that prices are formed fairly and they can fully benefit from the internal energy market," Oettinger said in a statement.

Mr Oettinger is proposing that traders and generators be required to give regulators details of their trading and production activities.

The new rules, which are expected to be enforced in 2012 following approval by EU states and the European Parliament, were deemed necessary because existing EU financial regulation does not cover a large part of transactions in the gas and electricity markets.


# Do it all right now

## Only EcoStruxure™ energy architecture provides up to 30% savings across the board – and it's doing it today

### The Global Specialist in Energy Management™

Schneider Electric™ applies expertise in information technology and energy management to deliver a new category of service: Intelligent Energy™.

Our response to the challenges of today's digital economy is EcoStruxure™, an approach to creating systems that are simplified, save money, and reduce waste by enabling guaranteed compatibility between the management of power, white space, process and machines, building control, and security. EcoStruxure provides end-users with critical tools that reduce system design time, CapEx, and OpEx.

### Immediate deployment means rapid ROI

EcoStruxure architecture leverages technology that is available *today* to ensure strength and capacity *tomorrow*. The results are immediate ROI and long-term sustainability.

As consumers, businesses, and entire economies become reliant on technology, they insist that devices become more intuitive, efficient, and intelligent. With EcoStruxure architecture from Schneider Electric, now they can expect the same of their energy.

**Attending WFES 2011?**
Bring this ad to Hall 3, Booth 3220 and enter to WIN an Energy Audit of your building!

Valued at €2000

Learn more about saving energy from the experts. Download our **FREE** white paper!

Visit www.SEreply.com • Key Code 84486t • Call +33 (0) 1 41 29 70 00

WORLD FUTURE ENERGY SUMMIT
Abu Dhabi, 17-20 January 2011

### Visit the Schneider Electric Booth and Energy Efficiency Theatre

Explore the latest energy trends and solutions to boost energy efficiency!

- Discover how **EcoStruxure** delivers up to 30% energy savings across your entire enterprise
- Learn how the **Smart Grid** will change the way we all use energy
- Gear up for **electrical vehicles** and the infrastructure they will require
- Ask about free online e-learning at **Energy University**™, now available for continuing education credits
- See how optimizing all your **energy management systems** delivers immediate savings

Make the most of your energy™

Schneider Electric™

# US launches export initiative


Still No. 1? Steven Chu fears US is losing its leadership

Stimulating clean tech exports will help the US to shore up its renewable energy sector until long-term energy policy is firmly in place.

Siân Crampsie

Eight US government departments have come together in a major push to promote renewable energy and energy efficiency exports as the country's domestic market falters amid regulatory uncertainty and the lending crisis.

The Renewable Energy and Energy Efficiency Export Initiative is being led by the US Department of Commerce and is designed to help meet US President Barack Obama's target of doubling all US exports within five years.

The initiative was launched as the latest figures from Ernst & Young's Renewable Energy Country Attractiveness Indices showed that China has once again increased its lead on the USA as a destination for renewables investment.

US Energy Secretary Steven Chu has also expressed his concern that the USA is losing its long leadership in scientific innovation and that China is pulling ahead.

Part of the problem is that the US currently lacks a long-range energy plan with sufficient government spending on research and development, Chu said in a recent speech.

The Ernst & Young index shows that heavy third-quarter investment in wind helped China to retain its top spot, as did the country's strong state finances, low production costs for renewable components, the introduction of feed-in tariffs for biomass and the availability of rare earth metals.

One in two wind turbines that go on-line in 2010 will be in China, estimates Ernst & Young.

While the US retained its second place on the broader All Renewables index, the continued effects of the global economic crisis, low power prices and policy uncertainty saw it drop one point on the index's scoring system. In comparison, China rose two points.

The government hopes that increasing support for exports will provide a boost for clean energy technology companies at home. Its new Export Initiative includes new funds to support private equity investments and a commitment by the US Ex-Im Bank and the Overseas Public Investment Corporation (OPIC) to identify and overcome constraints to closing renewables export deals and streamline financing applications.

In a report explaining the Export Initiative in full, US Secretary of Commerce Gary Locke notes that "many of the challenges faced by US RE&EE [renewable energy and energy efficiency] companies result from the lack of a strong national policy to provide incentives for developing domestic RE&EE technologies… the Initiative's commitments would undoubtedly be strengthened by domestic policies that place a price on carbon emissions."

In December, Congress threw a lifeline to the USA's ailing renewable energy industry by passing an extension to a tax credit scheme that supports investment in wind, solar and other forms of renewable energy.

The scheme, known as Section 1603 investment tax credits, was established in 2009 as part of Obama's stimulus plan and is essential to encourage the private sector to invest in renewable energy. Little progress has been made in Congress on a federal Renewable Energy Standard (RES), however.

The one-year tax credit extension will help to maintain investment levels, says the American Council on Renewable Energy (ACORE).

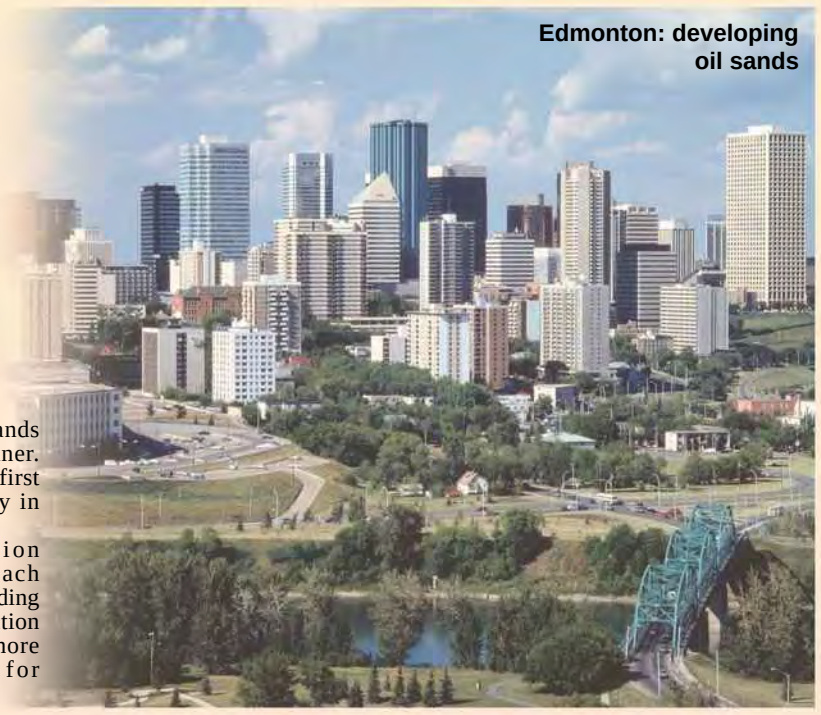
"Without question, the TGP [Treasury Grant Program] has been the most effective and successful national policy to promote renewable energy investment and deployment," said Marshal Salant, Managing Director at analyst firm Citi. "Continued access to the TGP will maintain the current level of investment in renewable energy projects, promote US energy independence and security, and protect and create US jobs."

In other positive developments for the renewable energy industry, US Secretary of the Interior Ken Salazar has announced an initiative to facilitate siting, leasing and construction of offshore wind projects off the Atlantic Coast.

The 'Smart from the Start' initiative has been widely welcomed by offshore developers, including PSEG Global, which said that the move would help to reduce red tape and create an environment that supports clean energy.

"Streamlining the leasing process by eliminating unnecessary steps is an important component in making offshore wind a commercially viable business," said Scott Jennings, president of PSEG Global. "The announcement shows that the Interior Department recognises that a more certain and expedited process can help unlock the potential of America's offshore wind resources and that they are taking action to advance those efforts."

# Shell seeks Quest approval


Edmonton: developing oil sands

A project that would capture more than one million tonnes of carbon dioxide ($CO_2$) per year from a Canadian oil sands facility has progressed with a regulatory application to the Alberta authorities.

Shell Canada says that the Quest Carbon Capture and Storage (CCS) project will capture, transport and store $CO_2$ from the Scotford Upgrader near Edmonton and could help Alberta and Canada resolve its need to develop valuable oil sands resources in a sustainable manner.

The project would also be the first application of CCS technology in the oil sands.

The regulatory submission includes applications for each component of the project – including the 84 km pipeline and the injection wells that will place the $CO_2$ more than 2 km underground for permanent storage.

# Mexico welcomes storage system

Mexico is planning to host one of the world's largest energy storage facilities, a 1000 MW sodium sulphide battery system designed to support wind farm and solar power developments in both the USA and Mexico.

UAE-based company Rubenius has announced plans to start construction of the $4 billion facility in Baja California, near the US border, in 2011.

Funding for the project has not yet been finalised. Rubenius has purchased 140 hectares of land in Baja California.

Mexican President Felipe Calderón has expressed his support for the project, which will help the country in its push to develop a low-carbon economy. "This is the kind of collaboration we should be doing more of among Mexico, the United States and private businesses from around the world," said Calderón. I commend Rubenius for participating in the roll out of alternative energy and products that help us use the power grid more efficiently."

Mexico has announced plans for an emissions trading programme in Mexico City and is aiming to source 25 per cent of its power from renewable energy sources by 2012.


Felipe Calderón: Mexican President

n Spain's Renovalia Energy and Grupo Bimbo, the world's largest producer of baked goods, have announced plans to build a 90 MW wind farm in Mexico. The $200 million facility will supply all of Grupo Bimbo's energy needs in Mexico and will be the largest wind farm operated by a food company anywhere in the world.

# IFC supports Kingston project

A new power plant in Kingston, Jamaica, will help to reduce power bills, according to Prime Minister Bruce Golding.

The $126 million greenfield project will produce 66 MW of power and will help to reduce the island's dependence on costly imported oil.

The project is being supported by the International Finance Corporation (IFC) and is scheduled to start operating in 2012.

"The project will benefit the people of Jamaica as well as its investors," said Wayne McKenzie, General Manager of West Kingston Power Partners, the project's developer. "While the technology used by the project will run on fuel [oil] for now, consistent with the Jamaica's energy policy, it has been designed to be converted into a natural gas-burning facility when that becomes available."

IFC has arranged a $100 million financing package to West Kingston Power Partners, including $22 million from its own account and $77 million from other institutions.

"IFC's engagement in Jamaica's power sector over the years has been positive, thanks to a sound regulatory regime that allows private investors to play a leading role," said Morgan Landy, IFC Senior Manager for Power. "The West Kingston Power project signals investors' confidence in Jamaica, despite the global downturn, and we hope that it will stimulate more power sector developments in the future."

# Nuclear plans in Asia gather pace

Recent bilateral agreements highlight a growing focus on nuclear power in a number of Asian countries, says **Syed Ali.**

Wen Jiabao: pushing bilateral cooperation

The signing of cooperation agreements between Pakistan and China, and Japan and South Korea demonstrate an increasing appetite for nuclear power in Asian countries.

At the conclusion of a state visit by Chinese Premier Wen Jiabao late last month, Pakistan and China agreed on an energy cooperation mechanism to push forward bilateral cooperation in civil nuclear energy and other energy-related fields.

"The energy cooperation mechanism will be established to push forward bilateral cooperation in conventional energy, renewable energy and civil nuclear energy," a joint statement said. It did not give any details of the cooperation mechanism.

Civil nuclear cooperation between the two countries has raised concerns in the US. China is a member of the Nuclear Supplier Group (NSG) whose guidelines prohibit the supply of nuclear power plants and related technology to Pakistan as it has not signed the nuclear Non-Proliferation Treaty.

In the past, China has helped Pakistan set up a 300 MW nuclear power plant in Chashma, about 200 km south of Islamabad, with a second nuclear power plant nearing completion there with Chinese assistance. Under the latest cooperation China will help set up two more plants.

Official sources in Islamabad said that projects inked during Wen's three-day visit include several thermal and hydropower plants and the mechanism to set up the two planned nuclear power plants at Chashma.

Also in late December, Japan and South Korea sealed a civilian nuclear pact that sets a legal framework for peaceful use and transfer of nuclear power technologies between the two countries.

Japan and South Korea have been competing in international bids for nuclear power plants mainly in emerging nations. The agreement will enable Japanese firms to export their nuclear power generation technologies and related equipment to South Korean companies for projects in a third country.

The deal, signed between Japanese Foreign Minister Seiji Maehara and South Korean Ambassador to Japan Kwon Chul Hyun, is still to be endorsed by the Japanese parliament.

Japan has been increasing its focus on nuclear both domestically and internationally in recent months.

At the end of November, the Japan Atomic Energy Commission decided to revise the 2005 framework for nuclear energy policy in view of recent changes including growing demand for nuclear power generation to help cut greenhouse gas emissions.

A group of 26 experts including JAEC Chairman Shunsuke Kondo will work out a new framework over the coming year.

The changes in the past five years after the creation of the present framework also include growing nuclear plant exports, quake-caused falls in the capacity utilisation rate for existing nuclear plants and delays in the development of a fast breeder reactor and a nuclear fuel reprocessing plant.

Interest in nuclear has been growing elsewhere in Asia. In the strongest indication yet that Philippines President Benigno Aquino's administration will embark on a nuclear energy programme before its term ends in 2016, energy chief Jose Almendras said it has now become a "real option" for the country.

Mr Almendras said funding is being sought from Congress to begin a comprehensive study on what it would take to start a nuclear power programme.

"We believe it is the cheapest and the most sustainable for a future portion of our electricity baseload," he recently told a media briefing.

Meanwhile Thailand's Energy Ministry is preparing to submit its nuclear power feasibility study to the government early this year, according to the Nuclear Power Programme Development Office (NPPDO).

The power development plan (PDP) for 2010-30 calls for as many as five nuclear power plants with a capacity of 1000 MW each, to go into operation between 2020 and 2030.

There are currently no operational nuclear power plants in Southeast Asia. Some Asean countries have announced plans to build reactors; others are still considering it as an option to cope with rising energy demand.

n The International Atomic Energy Agency (IAEA) says it will extend all-out support to Bangladesh in setting up a nuclear power plant. During a visit in December, Director General of the global nuclear watchdog Yukiya Anano said: "Bangladesh is an excellent partner of the IAEA. We will help the country strengthen the nuclear infrastructure and capacity building to set up the power plant."

## China committed to low carbon development

China says it will not follow the old energy-intensive economic development model of developed nations.

"Bearing in mind the long-term interests of both the Chinese nation and the whole human race, China will not copy the developed countries' old way of energy-intensive economic development," Liu Yanhua, a senior advisor to the Chinese delegation, told reporters during last month's United Nations Climate Change Conference in Cancun, Mexico.

China's promised commitment to low carbon development is especially important in light of recent forecasts of a massive rise in electricity consumption.

The China Electricity Council (CEC) in late December projected that the country's electricity consumption will almost double from the 2010 level to 8.2 trillion kWh by 2020.

In a report on the electricity industry's development in the 12th Five-year Programme period (2011-2015), the CEC said electricity consumption this year will reach 4.17 trillion kWh and increase to 6.27 trillion kWh by 2015.

China's installed power generating capacity will grow from 950 GW in 2010 to 1885 GW by 2020, the CEC report said, adding that by 2020 about 36.3 per cent of installed capacity will come from non-fossil fuels.

# Australia needs carbon price to increase power spending

Michael Fraser: AGL Energy chief executive

■ Investors "hedging their bets" ■ Sector needs $130 billion

New modelling shows that the Australian government's target of producing 20 per cent of the electricity supply from renewable sources such as wind by 2020 will not be achieved unless a price is put on carbon.

Chief executive Matt Zema of The Australian Energy Market Operator (AEMO), which did the modelling, said investors in the electricity industry were "hedging their bets" in the absence of clarity over a carbon price.

AGL Energy chief executive Michael Fraser echoed this, saying it was crucial to put a price on carbon before energy companies would build baseload generation.

He said: "With respect to coal fired generation, how could you justify building coal-fired generation when at the end of the day the whole purpose of introducing a carbon tax is in fact to close down coal fired power stations?

"That's the whole policy point, to achieve that outcome. With that hanging over your head, there's no way you can go and build baseload. And without a price on carbon, you can't justify building baseload gas either."

The AEMO research finds that between A$35 billion and A$120 billion in new electricity generation assets will be needed over the next 20 years as demand for electricity is forecast to rise between 30 and 70 per cent.

On top of this, between A$4 billion and A$9 billion is needed for transmission to connect up new capacity. AEMO is proposing a new A$8.3 billion link from Queensland through NSW and Victoria to South Australia and Tasmania to allow greater electricity trading between the eastern states in a bid to create a national power grid.

The Reserve Bank of Australia (RBA) recently warned that current electricity generation capacity is sufficient to meet demand and reliability standards only through 2013-14. Speaking to *The Australian Financial Review* it said that chronic under-funding of electricity infrastructure would send prices soaring unless supply is increased.

The potential cost of increasing that supply was outlined in a report commissioned and released at the end of November by the Australian government. The report carried out by US-based Electric Power Research Institute (EPRI) as part of Australia's Energy White Paper process, identifies estimated costs of different Australian electricity generation technologies to 2030.

The 2015 scenario shows mature technologies are generally at the low end of the cost range with the exception of simple cycle gas turbine power generation.

The 2030 scenario shows that the overall band of levelised costs across all technologies narrows considerably by that year.

## Corporate concern about climate change

Standard & Poor's Ratings Services and carbon analytics firm RepuTex Ltd recently announced the results of a survey which showed that corporations in the Asia Pacific region are seriously concerned about the impact of climate change on their industry, and are preparing to tackle increasing legislation aimed at curbing greenhouse gas emissions.

The survey canvassed the views of more than 300 Asia Pacific issuers rated by Standard & Poor's on their current and anticipated carbon exposure. From the 9 per cent of the organisations that responded, nine out of 10 respondents were concerned about the impact of climate change on their industry.

"Carbon risk is being transformed into a source of competitive advantage, with the most proactive Asia Pacific corporates starting to incorporate carbon management across their entire value chains," said Michael Wilkins, Managing Director and Global Head of Carbon Markets at Standard & Poor's.

According to the data provided by RepuTex, the most carbon-intensive sector in the Asia-Pacific region is utilities (58 per cent). In terms of country breakdown, Japan (31 per cent), China (29 per cent) and South Korea (11 per cent) produce the largest portion of carbon emissions in the region.

# Trade agreements boost Indian nuclear programme

India's international nuclear programme kicked off in earnest last month with the signing of trade agreements with France and Russia. **Syed Ali**

Recently signed trade agreements with France and Russia have given India's international nuclear programme a significant boost.

During a four day visit in early December French President Nicolas Sarkozy and his Indian counterpart Manmohan Singh discussed regional security, trade and investment and signed a multi-billion dollar framework agreement that will see French nuclear company, Areva, build the first two of 20 new nuclear reactors that India has planned.

The units will be the country's first to use non-domestic technology following the Nuclear Suppliers Group's waiver to allow international collaboration with India.

Under a deal worth $9.3 billion, Areva will construct two European pressurised reactors of 1650 MW each at Jaitapur in the western Indian state of Maharashtra. The two reactors, scheduled for completion in 2017-2018, were given clearance to proceed by the union ministry of environment and forests just ahead of Sarkozy's visit.

Sarkozy told reporters at a joint news conference with the Indian Prime Minister that the two countries' collaboration "has no limit". Singh said that India would "work closely with France to push forward the process of global economic recovery, better regulation, and financial sector reform."

The agreement is aimed at helping India meet soaring energy demand through the use of nuclear generation. Singh said some technical details of the agreement remained to be worked out.

India is potentially one of the world's biggest nuclear power markets, with plans to expand its capacity to nearly 63 000 MW by 2032. The Jaitapur units and others like it in the pipeline will increase the nuclear share in power generation from 2.9 per cent to 13 per cent by 2030.

Sarkozy is one of several western leaders that have visited India in an attempt to strengthen ties with the growing Asian power and gain a share of the lucrative nuclear energy market.

US President Barack Obama, UK Prime Minister David Cameron, Chinese Premier Wen Jiabao and most recently Russian President Dmitry Medvedev have all visited the country in recent months. The visits are seen as a sign of India's growing importance on the world stage.

In late December India also signed an agreement with Russia for the supply of more Russian nuclear reactors.

A joint statement issued at the conclusion of the 10th annual summit states that the two countries reviewed the progress that has been made for the commissioning of Kudankulam Units 1 and 2 and the discussions for setting up additional units at the site including Units 3 and 4.

During both the France and Russia meetings, concerns were raised regarding the implications of India's recently passed nuclear liability law. Russia said it was awaiting clarifications on certain sections of the new legislation.

# Thailand plans more spending to keep lights on

Thailand's state-owned electricity company Electricity Generating Authority of Thailand (Egat) is hoping that investing an additional Baht 30 billion ($1billion) over the next five years will stop spinning reserves falling below 10 per cent, preventing possible blackouts.

Sutat Patmasiriwat, Egat's governor, said Baht 20 billion will be spent to build a new 800 MW gas-fired unit at the North Bangkok power plant and another Baht 10 billion to increase the capacity of its power transmission network.

The two projects add to Egat's planned spending of Baht 40 billion through 2014 for a second unit at the Chana plant in Songkhla and a fourth unit at the Wang Noi plant in Ayutthaya, each with a capacity of 740 MW.

The plan adjustment is being forced by a two-year delay on the start of two independent power projects and power consumption growth of 10 per cent year-on-year in the first nine months of 2010 against Egat's original estimate of 4.5 per cent.

"If we don't do anything, power reserve will fall to 9 per cent in 2014 compared with a normal level of 15 per cent," said Mr Sutat.

Upgrading power transmission lines will serve Egat's plan to boost the amount of electricity purchased from small power producer (SPPs) by another 1500 MW above the original target of 2000 MW.

More than 4000 MW from SPP projects joined Egat's new round of SPP bidding in 2010, and results will be known early this year.

In a separate announcement, independent power producer Glow Energy said it expects to invest about Baht 4 billion to acquire assets of UK-based Independent Power (IP) in Thailand and up to $200 million to build a new 120 MW unit near its Huay Ho hydroelectric plant in Laos.

Locally, Glow has joined a new round of Small Power Producer bidding by proposing three gas-based plants to Egat with a combined capacity of 240 MW. These projects will require spending of $100 million to $150 million.

Thais were also recently warned to cut power consumption. Sethaput Suthiwart-narueput, an executive vice-president and the chief economist at Siam Commercial Bank's Economic Intelligence Center (EIC) said: "… if Thais don't start saving energy right now, they'll surely experience massive power blackouts and brownouts."

# Europe backtracks on coal mines

Funding for renewable energy projects is drying up, but the European Commission is considering plans to extend subsidies for coal mines. **Siân Crampsie**

The European Commission is likely to revise a plan to force EU Member States to close uncompetitive coal mines by October 2014 following protests from Germany.

The EU executive body had proposed that subsidies to loss-making coal mines should be phased out, with financial assistance provided to Member States to tackle the economic and social effects of mine closure.

Financial assistance would only be given to those states that pledge to close down uneconomic mines.

Germany – one of the Member States that would be most severely affected by the plans – has lobbied hard against the proposal and it is now thought that the Commission will extend the deadline for closure to 2018.

In October Spain's government successfully argued that electricity generators in Spain using domestic coal should be given priority in the Spanish electricity market. Its plan to in effect subsidise domestic coal mines was approved by the European Commission but criticised by environmental groups such as WWF.

An extension of the deadline to close uneconomic mines is also likely to be met with strong opposition from environmentalists, who say that such plans contradict the EU's climate objectives.

Their argument is particularly strong given the recent withdrawal of support for renewable energy by various governments around Europe.

Germany argues that the extension will be crucial for security of supply.

In early December the French government issued a draft decree to impose a four-month suspension on feed-in tariffs for new solar photovoltaic (PV) installations of more than 3 kW capacity.

The Spanish government has also approved a 35 per cent cut to incentives for wind until 2013, and has removed support for solar thermal projects in the first year of operation. The ruling is in line with proposals put forward in July 2010 and also limits the number of hours that wind and solar thermal facilities can be eligible for government support.

Spain has already approved cuts of up to 45 per cent for solar PV installations.

Renewable energy associations in Spain are not overly concerned about the changes, according to media reports, although it is possible that the new rules may temper investors' appetite for the country's renewable energy sector, particularly in the current economic climate.

A new report into clean-tech funding released by International law firm Taylor Wessing indicates that governments must continue to make long-term commitments to the renewable energy sector in order to underpin investor confidence.

The report: *Bridging the Funding Gap – The future of European Cleantech and Renewables* – says that one of the most important drivers for investment by private sector companies is the removal of uncertainties related to national regulatory policy and support frameworks. It also says that corporates and project developers are influenced by government initiatives such as the availability of public funding, grants and incentives.

The main conclusions of the report have been echoed by a European venture capital and private equity association, which has warned that Europe's historical leadership in environmental technologies is under threat.

"Venture capital and private equity has been at the vanguard of EU low-carbon innovation," said Patrick Sheehan, chairman of the European Venture Capital and Private Equity Association (EVCA) environmental task force.

"For an investment theme that did not exist ten years ago, clean-tech is already delivering highly successful returns. But without the right regulatory framework to significantly scale up investment, Europe risks not only missing crucial low-carbon targets but an immense opportunity to become a global powerhouse in a vast new energy economy."

Brussels-based EVCA has called for the EU's 2020 energy efficiency targets to be made binding and for the creation of a venture capital fund-of-funds, with matching public and private sector financing, which would in part invest in clean-technology fund managers.

Another report from KPMG says that Europe's offshore wind industry is under threat because of low returns on investment and difficulties in securing investment.

# Germany passes nuclear extension package

The German government's plan to extend the lifetimes of the country's 17 nuclear power plants has been approved by parliament, but could yet face legal challenges.

In spite of strong opposition, the Bundesrat gave its approval to legislation that defers the closure of the facilities by an average of 12 years. The law overturns the policy of the previous Social Democrat-Green coalition government.

The new law also reflects Chancellor Angela Merkel's wish that nuclear power should provide a low-carbon 'bridge' between Germany's current energy system and a future one that is dominated by renewable energy.

Several German states ruled by the opposition Social Democratic Party have said that they will challenge the policy in the constitutional court.

The legislative package includes a new tax on power companies that operate nuclear power plants, proceeds from which will be used to develop renewable energy plants.

In September Merkel outlined an ambitious plan to source 80 per cent of Germany's electricity supplies from renewable sources by 2050, and to cut carbon dioxide emissions by 80 per cent from 1990 levels by 2050.

# Commission to clamp down on carbon crime

- Legislative proposal possible in 2011
- Spot market is a particular concern

The European Commission is embarking on an analysis of the region's carbon market to determine whether closer regulatory oversight is required.

The EU's executive body is concerned about fraudulent practices in the market, which, it says, needs to serve as a cost-effective means of reducing greenhouse gas emissions.

"The European carbon market is a relatively young market which has grown rapidly during its first six years of operation, both in size and sophistication," said European Commissioner for Climate Action Connie Hedegaard. "It is… important that the market can continue to expand and safely be relied upon to give an undistorted carbon price signal to investors and decision-makers in boardrooms across the EU."

According to Hedegaard, the Commission's work may lead to a legislative proposal in 2011. The Commission is particularly concerned about the integrity of the spot market.

In December, the EU's law enforcement agency Europol estimated that around €5 billion of emission trading scheme (ETS) monies had been lost to criminals in the last 18 months, and that in some countries, up to 90 per cent of the market's volume had been a sham.

Energy news agency ICS Heren has also reported that 1.6 million EU allowances had been stolen from a Romanian account.

**Connie Hedegaard: concerned about spot market integrity**

# Powerfuel weighed down by CCS burden

The UK's plans to be at the heart of carbon capture and storage (CCS) commercialisation suffered a further blow with news that Powerfuel has been put into administration, writes **Siân Crampsie.**

Powerfuel, the developer of a key CCS project in the UK has gone into administration. The company was hoping to be the first to develop a commercial scale clean coal plant with CCS but was crippled by the cost of the project.

The company operates a colliery at Hatfield in Yorkshire and was planning the construction of a coal gasification plant equipped with CCS. It had also recently announced plans to build Britain's first carbon-free natural gas-fired power plant.

Powerfuel has appointed KPMG as administrator and is aiming to find a buyer who can shoulder the £800 million cost of building the 800 MW IGCC plant and CCS plant. The firm also says that £30 million is also required to upgrade its Hatfield coal mine.

The company was excluded from the UK government's CCS funding competition, which was limited to projects using post-combustion carbon capture technology, but won €180 million of funding from the European Commission.

Only one bidder remains in the UK government's CCS competition after E.On and other bidders pulled out.

The government has sought to revive interest in CCS development by announcing that it would make future funding available to gas-fired power projects. However, Powerfuel's difficulties are an indication of the financial burdens that companies face in developing CCS demonstrations.

Elsewhere in Europe CCS projects are continuing apace. In December Alstom announced that its proprietary chilled ammonia process has been selected for a CCS demonstration project at the Turceni power plant in Romania.

In Germany, Outotec has commissioned a new $CO_2$ removal pilot plant at its R&D centre in Frankfurt. The technology is designed to complement Outotec's circulating fluidised bed (CFB) pilot plant allowing for the cleaning of process gas from iron ore direct reduction as well as from coal and biomass gasification.


FIELD REPORT#1
Country
Finland
Location
Olkiluoto
Fulfilling new-generation safety requirements makes economic sense.
Utilities must satisfy new and ever increasing safety requirements and achieve the best economics possible. The EPR™ design does both.
The EPR™ is the most scrutinized advanced design in the world. It's already being built in Finland, China and France, and is undergoing regulatory reviews in the US and the UK. That return on experience is already helping utilities achieve timely design and licensing reviews.
The requirements of forward-looking utilities and safety authorities were incorporated at the earliest design stage. The resulting safety features were optimized with nuclear operators who have extensive experience in generating competitive megawatts.
Fulfilling new-generation safety requirements does make economic sense – now and for the next 60 years.
Return on Experience
CONFIDENCE IN PROJECT ECONOMICS
Some call it an achievement.
We call it another reason to keep doing better.
Find out why : www.areva.com/fieldreport
AREVA
06.08.09
EGGS AGENCE
Energy is our future, don't waste it! - © Copyright AREVA - September 2010


FIELD REPORT#2
Topic
Fuel Reliability
Location
Worldwide
Close collaboration secures fuel performance and reliability.
We share a common goal with our customers: to harness the highest level of expertise, innovation and in-reactor experience feedback for safe and successful fuel operation, no matter how tough the conditions may be. Utilities want to maximize power output and uranium utilization through optimized fuel design and operation. To get there requires high-quality fuel, on-time delivery, optimal core management, and close daily collaboration between utility engineers and AREVA experts. Constant dialogue is the key: More than 600 engineers work with our customers on more than 140 reloads every year for a broad range of operating environments making AREVA's worldwide fuel experience with light water reactors unparalleled. AREVA fuel products are continuously upgraded to preserve their reliability and increase performance under tougher operating conditions. Such evolutionary innovation is supported by constant efforts in Research & Development leveraging AREVA's panel of dedicated R&D test facilities worldwide. Thanks to decades of close collaboration with customers, AREVA continuously integrates acquired in-reactor experience feedback to achieve optimal fuel performance and reliability.
Return on experience
INCREASED RELIABILITY
Find out why: www.areva.com/fieldreport
AREVA
EGGS AGENCE
Energy is our future, don't waste it! - © Copyright AREVA - September 2010

# Investors see opportunities in Turkey's growth

## The Turkish government hopes that a stable regime and strong economic growth will attract much needed foreign capital to its power sector. **Siân Crampsie**

Turkey's government has called for foreign investment in its energy sector in order to help the country meet rapidly growing energy demand.

Recent privatisations of Turkish energy assets have attracted predominantly local investors but the government believes that foreign capital will be required to meet investment needs.

In early December Turkey successfully completed the privatisation of its power distribution sector with the sale of three grids in a fiercely contested auction.

The sell-off of power distribution grids began more than two years ago and the government is also expected to privatise around 15 GW of generating assets.

Privatisations in Turkey have attracted progressively higher prices from bidders and have more recently been shunned by foreign investors.

In the latest auction, Yildizlar Holding bid $2.075 billion for the Toroslar grid, which serves 2.7 million customers in the Adana region, while Park Holding bought the Akdeniz grid, which serves 1.5 million customers in the Antalya area.

Turkish billionaire Mehmet Emin Karamehmet, who controls mobile phone operator Turkcell, took control of Istanbul's electricity distribution network on the Asian side with a $1.8 billion bid.

According to analysts, investors are prepared to pay premium prices for the distribution assets in order to gain an operating base in Turkey's power sector, which is set to grow by around 30 per cent over the next four years. Ownership of distribution grids would also make sense for companies that are investing in generation.

Turkish Energy and Natural Resources Minister Taner Yildiz said last month [December] that electricity generating capacity needs to grow by 3500-4000 MW per year in order to meet growing demand. The government insists that the country's infrastructure, bureaucracy and laws make it an attractive option for international capital.

Foreign companies participating in the latest round of privatisations include Austria's Verbund, which owns Enerjisa in conjunction with the Sabanci group. Other overseas firms active in Turkey include AES, which recently signed an agreement with Koç Holding to form a joint venture company, AES-Entek.

The joint venture firm will own 300 MW of natural gas facilities in Turkey and will also diversify into other energy sources by developing greenfield projects and pursuing various acquisition and privatisation opportunities.

**Taner Yildiz: capacity needs to grow to meet increasing demand**

In November Statkraft announced plans to build a 102 MW hydropower plant in Turkey. "Constructing the Kargi hydropower plant is an exciting investment," said Øistein Andresen, Executive Vice President in charge of International Hydropower in Statkraft. "It gives Statkraft a firm foothold in Turkey, a market with high economic growth, increasing energy needs and a major hydropower potential.

Earlier in 2010 the Norwegian firm completed construction of its first hydropower plant in Turkey – the 20 MW Cakit plant. It will invest €250 million in the construction of the Kargi plant.

Other major foreign investments in Turkey's power sector include the construction of the country's first nuclear power plant, which is being developed by Russia's Rosatom. The plant is expected to be licensed by the end of 2011 and will cost around $20 billion to build, according to recent local media reports.

Turkey's state-owned electricity corporation has guaranteed to buy a fixed amount of the plant's output over the first 15 years starting from initial commercial operation at a reported price of US¢12.35/kWh, with the rest of the electricity to be sold on the open market.

Commercial operation is expected in 2018.

# Ukraine adopts environmental strategy

- EBRD supports efficiency programme
- Perception of risk is obstacle to investment

Ukraine is aiming to improve its environmental credentials through the adoption of a new environmental law.

The country's parliament has approved the new law, which outlines a basic strategy for environmental policy and makes provisions for the adoption of energy saving technologies and low-carbon energy sources.

The approval of the law came in December, just weeks after the European Bank for Reconstruction and Development (EBRD) launched a technical assistance programme for Ukraine that is designed to promote residential energy efficiency.

According to the EBRD, Ukraine's residential housing stock could absorb energy efficiency investments worth around €60 billion, resulting in energy savings of over 60 000 000 MWh per year. Such savings would be equivalent to almost 10 billion $m^3$ of imported natural gas or 25 per cent of all Ukraine's natural gas imports.

The programme will be funded by the EBRD's shareholder special fund and will assist the Ukrainian Ministry of Housing and Communal Services. It will examine issues related to legal and regulatory framework, general awareness, capacity and low penetration of energy efficient technologies in the country.

A recent report from the International Energy Agency (IEA) says that private sector investors view energy efficiency projects as having a relatively high level of risk and that financial instruments could be employed by governments to bridge the 'perception gap'.

This gap is caused by, among other things, the uncertainty surrounding expected energy savings, the small size of individual projects and their technical nature, the IEA says.

However, "case studies and data gathered for this study suggest that policies, both financial and non-financial, exist to overcome the perceived higher risk associated with energy efficiency investments", the IEA report says.

# Jordan revises nuclear plans

Bidders participating in the tender for the construction of Jordan's first nuclear power plant have been asked to submit revised bids after the country's government changed the site for the planned facility.

Three companies have been shortlisted for the project by the Jordan Atomic Energy Commission (JAEC) for the project, which will be built in Majdal, central Jordan, rather than the Red Sea port of Aqaba as originally planned.

Revised bids will be submitted this month and the winning bidder could be chosen by March. In February, Jordan is expected to open its first nuclear facility, a small-scale sub-critical reactor that will be used for training and research.

The three preferred bidders are France's Areva in partnership with Japan's Mitsubishi Corp., Russia's Atomstroyexport, and Atomic Energy of Canada Ltd. They are bidding to construct a nuclear power plant of up to 1000 MW in capacity, with an option to build a second.

Belgium's Tractebel Energia SA is carrying out a survey of the new proposed location to see if it is suitable, according to JAEC.

# US approves nuclear deal

Russia and the USA will be able to expand their cooperation in civilian nuclear energy after the latter's Congress gave its approval to a nuclear accord.

The pact – known as the 123 Agreement – will pave the way for new business opportunities between the two countries in the civilian nuclear energy field as well as boost non-proliferation efforts.

It is a sign of improved relations between the two countries, particularly Russia's cooperation with the USA in pushing for sanctions against Iran's suspected weapons programme.

In addition to allowing trade, the agreement will allow the two countries to pursue joint research projects, including uranium enrichment and research into next generation reactors.

Environmentalists in Russia are concerned that the agreement could pave the way for Russia to import spent nuclear fuel from the USA for reprocessing and storage.

# Masdar launches solar plant

Abu Dhabi's Masdar Initiative has marked a milestone with the completion of a 1 MW solar power system on the roof of the Masdar Institute building in Masdar City.

The rooftop system has been built by SunPower Corp and will deliver renewable energy to the Institute building, the first to be completed in Masdar City. Its commissioning is a positive step for the Masdar programme, which recently was forced to revise investment plans in the wake of the international lending crisis.

The SunPower system is installed on a canopy structure that provides shade for the roof terrace as well as clean, renewable solar power for the facility. It is equipped with SunPower's E19 solar panels, which can achieve efficiencies of 19.3 per cent in standard conditions.

# Alstom sets sights on Russian growth

## Alstom wants to capitalise on growth in the Russian energy market and gain access to a low-cost manufacturing base.

Patrick Kron: committed to Russia

Siân Crampsie

Alstom is planning to boost its position in Russia's energy market through a raft of new agreements designed to strengthen existing partnerships as well as forge new ones.

The France-based engineering company is already active in sections of Russia's rapidly growing market for power plant equipment but is keen to localise manufacturing operations as well as gain ground in key sections of the market, such as nuclear power.

The company has signed memoranda of understanding with firms such as Atomenergomash, Inter RAO UES and RusHydro covering the markets for equipment for the nuclear, fossil and hydro energy markets.

Russia and the neighbouring CIS countries have a combined installed capacity of over 350 GW, around half of which is more than 30 years old, says Alstom. In addition to refurbishment needs, rising energy demand in the region means that significant amounts of new generating capacity are required.

Russia alone is building ten new large nuclear power plants and a 60 per cent increase in its hydropower capacity over the next decade is also forecast, according to Alstom.

In the nuclear sector, Alstom has signed an agreement to strengthen AAEM, its venture with Atomenergomash, by setting up a local facility for the manufacture of Alstom's Arabelle nuclear steam turbines as well as of large steam turbines for fossil fuel applications.

The AAEM joint venture will also extend its business into offering emergency diesel generators for the nuclear power plant market.

Under a second, MoU, the AAEM joint venture is considering teaming up with a joint venture between Inter RAO and Worley Parsons to deliver turbine islands for nuclear power plants using Russian technology reactors.

Alstom and Atomenergomash are also considering opening up the capital of AAEM to Inter RAO, a move that would open up Russia's steam power plant market to Alstom.

"A local manufacturing facility will allow us to build our leading nuclear turbine island components and steam turbines in Russia and is a further commitment from Alstom to serve Russia's growing energy needs," said Patrick Kron, Chairman and CEO of Alstom. "Through our extended partnership with Atomenergomash and the agreement with Inter RAO-WorleyParsons, we will eventually develop an optimised turbine island offering for Russia and offer best in class service both in terms of design technology and project execution."

Around 11 per cent of Russia's installed nuclear base is nuclear and by 2016 ten new reactors totalling just under 10 GW of capacity should be operational. Further reactors totalling 21.7 GW of capacity are planned, says Alstom.

Under another agreement, Alstom and Inter RAO are planning to jointly provide industrial products and services for Russia's power industry, including the installation of new instrumentation and control systems as well as site security systems in projects.

Alstom has also signed a strategic cooperation agreement with RusHydro JSC, Russia's largest hydropower generation company. Together the two companies will examine opportunities for constructing local manufacturing facilities and cooperate in the construction of new plants.

# NuGen created for new nuclear

GDF Suez, Iberdrola and Scottish and Southern Energy plc have confirmed that they will submit plans to build a new nuclear power plant in the UK.

The three companies have established their joint venture company, called NuGeneration Ltd., and say that they will make a final investment decision in 2015.

NuGen is aiming to develop up to 3.6 GW of new nuclear capacity at a site in Cumbria, northwest England, for which it secured an option in late 2009. NuGen's greatest strength will be its ability to "draw upon the experience, resources and skills of three well established and respected energy companies, that have experience of operating and delivering nuclear, and other generation plants, across Europe", according to Alfio Vidal, the company's Chief Nuclear Director.

■ GDF Suez has announced that the merger between GDF Suez International and International Power has been approved by more than 99 per cent of International Power shareholders. The deal creates the world's largest independent power producer and was described by Gerard Mestrallet, Chairman and CEO of GDF Suez as "the most important merger and acquisition deal in Europe in 2010".

# Fortum expands in Poland

Fortum has expanded its operations in Poland's energy sector through the acquisition of two state-owned energy companies.

The Finnish energy company, which recently divested Swedish district heating facilities outside of Stockholm for €200 million, has bought 85 per cent stakes in Elektrocieplownia Zabrze SA and Zespol Elektrocieplowni Bytom SA for €20.6 million.

The sale of the two companies – which produce heat and power for local municipalities in the Silesia region – was part of Poland's power sector privatisation. The transaction will increase Fortum's power production capacity in the country and provides it with access to the second largest heat market in Poland with 2.3 million citizens living in 21 municipalities.

In September Fortum commissioned its first combined heat and power (CHP) plant in Poland. The 64 MWe, 120 MWth plant in Czestochowa is one of the first in the country to use significant quantities of biomass as a fuel.

Last month [December] Fortum sold 12 heat operations in central Sweden to funds managed by Australian investment bank Macquarie Group.

# E.On fine upheld

■ Anti-trust seal broken ■ E.On sells stake in Gazprom

E.On will have to pay a fine imposed on it by the European Commission after the European Union's Court of Justice ruled that the fine was appropriate and justified.

The Commission had fined the German energy giant €38 million after the company was found guilty of breaking a seal placed on a door by EU anti-trust investigators after a raid on the offices of E.On Energie in 2006.

E.On had appealed to the lower chamber of the European Court of Justice in Luxembourg, challenging both the imposition of the fine and the size of the penalty.

The court ruled that "the Commission was entitled in law to consider in the present case that, at the very least, the seal had been negligently broken," and that E.On Energie "was required to take all necessary measures to prevent any tampering with the seal".

The €38 million fine is equivalent to 0.14 per cent of E.On Energie's annual turnover.

In a separate development, E.On has announced plans to sell its 3.5 per cent stake in Gazprom for €3.4 billion. The sale is part of plans by E.On to cut its debt by realising €15 billion of asset sales by the end of 2013. It also reflects E.On's increasingly strained relationship with the Russian gas producer.

E.On took over its stake in Gazprom in 2002 when it bought German gas producer Ruhrgas. In recent years a dispute over pricing policy with Gazprom has soured relations, with E.On leading a group of European energy companies calling on the Russian firm to stop linking gas prices with the price of oil.

E.On says that its relationship with Gazprom remains solid, and that it has been cemented by the two companies' participation in the Nordstream gas pipeline.


The European Court of Justice ruled against E.On

# Dynegy settles for Icahn deal

Dynegy's Board of Director's has approved an all-cash offer to be acquired by Icahn Enterprises following the failure of Blackstone Group to buy the Houston-based power company.

Icahn's all-cash offer of $5.50 per Dynegy share values Dynegy's equity at about $665 million and is around ten per cent higher than the best offer made by Blackstone.

Blackstone's bid for Dynegy, which has around $3.95 billion of outstanding debt, had been repeatedly rejected by shareholders, including hedge fund Seneca Capital and Carl Icahn, owner of Icahn Enterprises.

Icahn and Seneca are Dynegy's largest investors and had rejected Blackstone's original offer of $4.50 per share. Blackstone lifted this to $5 per share but continued opposition from Seneca and Icahn meant that the bid could not secure shareholder approval.

Bruce A. Williamson, Chairman, President and Chief Executive Officer of Dynegy Inc., said: "We believe the IEP offer, coupled with our continued ability to solicit superior proposals and the commitment of IEP to support a company accepted all-cash offer for 100 per cent of the company, is a very positive outcome for all Dynegy stockholders."

# Tenders, Bids & Contracts



## Americas

### B&W wins nuclear uprate contract

Omaha Public Power District (OPPD) has awarded Babcock & Wilcox Nuclear Energy Inc. a $24 million contract for uprate modifications at the Fort Calhoun nuclear generating plant in Nebraska.

The contract will be carried out during the plant's 2012 refuelling outage and includes engineering and construction work to replace critical components and make associated plant modifications. It is the largest contract to be awarded by OPPD in its efforts to increase the capacity of the Fort Calhoun plant by 17 per cent.

### Hydro-Québec accepts wind bids

Hydro-Québec Distribution says that it has accepted 12 bids totalling some 291.4 MW in response to a call for tenders for the purchase of 500 MW of wind power generated in Canada's Québec province.

Together the projects call for capital expenditures of C$730 million ($730 million) on wind farm construction and another C$260 million on power transmission. Deliveries of electricity must start between December 2013 and December 2015.

Hydro-Québec Distribution is planning to finalise contracts with the project developer over the coming months. The average price of the accepted bids is 13.3 ¢/kWh, including 2.0 ¢/kWh to transmit the electricity generated.

### Yukon selects Mayo B equipment

Yukon Energy has chosen ABB to provide the mechanical, electrical, and automation equipment for its Mayo B hydroelectric project, located on the Mayo River, in the Yukon, Canada.

The Mayo B project is a key part of Yukon Energy's plans to boost generating capacity in order to meet growing energy needs and will increase the power generated at the site from 5 to 15 MW.

ABB will supply the excitation system, governor system, and various mechanical and electrical auxiliaries for the project. It is executing the project as part of a strategic alliance with Chongqing Yunhe Hydropower Group, one of the world's leading turbine suppliers in the small hydro market.

### RPM Access selects Nordex turbines

Nordex USA has announced an order with wind farm developer RPM Access to provide the wind turbines for a 41 MW wind farm in Iowa, USA.

The order comes just weeks after finalising a 75 MW order from EverPower Wind Holdings and follows the official opening of the company's new manufacturing plant in Arkansas in October 2010.

The Elk wind farm is Nordex's first project with RPM Access and is a construction-ready project slated for completion in October 2011. RPM Access will own and operate the wind farm, and Central Iowa Power Cooperative will purchase the power via a 20-year power purchase agreement.

Nordex will equip the Elk wind farm with its N100 wind turbine model.

### American Superconductor selects superstation partners

American Superconductor has chosen Korea's LS Cable Ltd. and Nexans of France as the superconductor power cable subcontractors for the Tres Amigas SuperStation project in New Mexico, USA. It has also selected Power Engineers as its Owner's Engineer for the project.

The two cable companies will manufacture superconductor power cables for the superstation, which is described by American Superconductor as a first-of-its-kind power transmission hub that will link three electricity transmission grids in the USA. The cables will use Amperium, American Superconductor's proprietary second generation (2G) high temperature superconductor (HTS) wire.

As owner's engineer, Power Engineers will provide a wide range of engineering support to design, specify and manage the engineering activities for the project.

Tres Amigas is intended to enable the faster adoption of renewable energy and increase the reliability of the US grid.

## Asia Pacific

### Macquarie expands Liddell plant

Macquarie Generation has awarded a contract to build a new solar field at the Liddell solar thermal power plant in Australia to Novatec Solar.

The new 9 MWth solar array will double the size of the plant's existing solar array and make it the largest solar thermal energy project in the Southern Hemisphere.

Novatec Solar, a unit of Transfield Holdings, will start construction of the 18 000 m$^2$ solar field in early 2011 and is scheduled to complete it in 2012.

### Vestas masters China

Danish wind turbine manufacturer has won a contract from Master Investment Company Ltd. to supply equipment for a new wind farm in China.

The 49 MW project is located in Huianbao, Ningxia Hui Autonomous Region. Vestas will supply, install and commission 25 of its V90-1.8/2.0MW wind turbines as well as a SCADA system.

The order includes a two-year service and maintenance agreement. The turbines are scheduled for delivery in the second quarter of 2011.

### Alstom wins €70 million Chinese hydro contract

The Datang Guanyinyan Hydropower Development Co. Ltd. has awarded Alstom a contract worth around €70 million for the supply of equipment to a new hydropower dam in China.

The contract includes the supply of three 600 MW Francis turbine generator units for the Guanyinyan hydropower station on the Jinsha River in Yunnan province. The first unit is due to enter commercial operation in 2014.

## Europe

### ABB wins NordBalt contract

Sweden's Svenska Kraftnät and Lithuania's Litgrid turtas AB have placed orders worth $580 million with ABB for the supply of a new power transmission link between the Nordic and Baltic regions.

The new NordBalt transmission link will be based on ABB's HVDC Light technology and will increase capacity, facilitate power exchange, enhance grid reliability and improve security of supply in the two regions.

The 400 km link will have a capacity of 700 MW. ABB will design, engineer, supply and commission the two converter stations and two 300 kV underwater cables. The converter stations will be located in Nybro, Sweden and Klaipeda, Lithuania.

The project is regarded as a priority by the European Commission, which is keen to boost energy exchanges in Europe in a bid to create a single market.

### Nexans to provide Malta cable

Malta's Enemalta Corporation has awarded Nexans a €178 million turnkey contract to provide the cable and a substation for a new high voltage submarine power link between Malta and Sicily.

The 100 km-long, 200 MW alternating current (AC) link will provide Malta with its first power interconnection with mainland Europe. Nexans will design, manufacture and install the cable as well as seabed protection, and will also build a 220 kV substation in Malta.

The 220 kV interconnector will allow the import and export of power between Malta and Sicily as required. The entire system has been designed to allow the construction of a second 200 MW interconnector by the end of 2015.

### Alstom secures EDF contract

Alstom has won contracts worth €340 million to rehabilitate and maintain some of EDF's nuclear power plants in France.

The contracts form part of EDF's efforts to improve the reliability and increase the output of its nuclear fleet, which provides around 75 per cent of France's electricity needs.

Under the contracts, Alstom will supply stators for 900 MW and 1300 MW generators, rotors for 900 MW generators and lines of rotors for 900 MW steam turbines.

## International

### Rolls-Royce awarded African contracts

Rolls-Royce has been awarded contracts to provide 11 Bergen B32:40 diesel engine-powered generating sets to the electrical authorities of Tanzania and Madagascar.

Working with its consortium partner, Semco Maritime A.S. Rolls-Royce will install ten B32:40V16 sets, each rated at 6.29 MW, in Mwanza, the second largest city in Tanzania. Another Bergen B32:40 powered generating set will be installed at the Mahajanga power station operated by Jirama, the Madagascar Electric Utility.

The Madagascan contract was awarded by Broadcrown Ltd, a UK-based independent manufacturer of power generation systems.

### Iraq invites plant bids

Iraq wants investors to build, operate and maintain four new power plants that will boost its electricity supplies by 2750 MW.

The government is holding a competitive tender and is planning to award contracts for the four plants to developers in May.

Iraq's current electricity production levels stand at around 7000 MW but provide only around half of actual demand. Officials are hoping that the country's improved security will attract both local and international investors.

The four power plants will be situated in Basra, Diwaniya, Muthanna and Maysan provinces and will source fuel from nearby oil and gas fields that are being developed by international energy companies. The government says it will help developers by removing obstacles that currently discourage investment.

### Samsung plans Macedonian wind farm

South Korea's Samsung Heavy Industries and Korea South East Power Co. (KOSEP) are planning to build a wind farm in Macedonia.

The two companies are teaming up to develop a 100 MW facility in Stip, 110 km east of Macedonia's capital Skopje. They are scheduled to complete the $208 million project by the end of 2012 and will operate it for 20 years.

Samsung Heavy and KOSEP will fund around 51 per cent of the project, with the remainder to be financed by the Macedonian government and the European Bank for Reconstruction and Development (EBRD).

### Saudi Aramco selects GE

GE has announced that it has been selected by Saudi Aramco, Saudi Arabia's state-owned national oil company, for agreements totalling nearly $500 million to supply a broad range of equipment and services for an expansion of the Shaybah gas-oil processing facilities.

GE is to supply 11 gas turbine generators, 44 compressors as well as motors and services that will help Saudi Aramco expand the Shaybah oil field in the south east of the country.

### Cape Verde plans wind farm

Cabeolica SA has placed an order with Vestas for the supply and installation of 30 wind turbines on four islands of the Cape Verde archipelago.

The Danish wind turbine manufacturer is to supply its V52-850 kW wind turbines for the 25.5 MW project, which is scheduled to be completed by the third-quarter of 2011. The turbines will be installed on the islands of Santiago, Sal, Sao Vicente and Boavista.

The contract also includes a 12-year service agreement and a Scada solution for each of the wind farm sites. The four wind farms will generate around 120 000 MWh/year.

### Bechtel selected for UAE nuclear project

Bechtel is to provide design and project management support services for the Middle East's first nuclear power plant, the company has announced.

The US engineering firm is to provide project support to Korea Electric Power Corporation (Kepco) subsidiary Kepco E&C both in Seoul, Korea and at the project site in Braka, western Abu Dhabi.

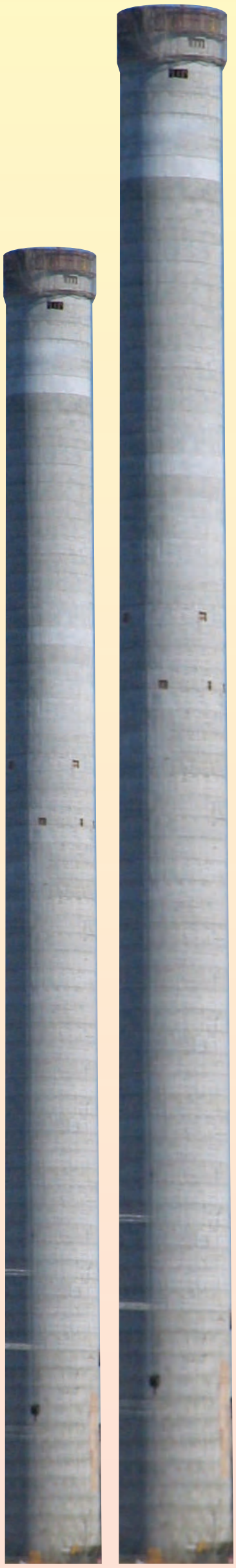
The plant will be one of four that a consortium headed by Kepco will build and manage in the United Arab Emirates.

### Vogt Power wins Latvian contract

Gama Power Systems Engineering and Contracting Inc. has awarded Vogt Power International Inc. a contract to supply a heat recovery steam generator (HRSG) and associated equipment to the Riga TPP2-Phase II combined cycle power project in Latvia.

Vogt Power will supply one unfired, three pressure level natural circulation HRSG with reheat section for use behind a GE 9FB gas turbine for the Riga CHP-2 power plant rehabilitation programme, replacing the old generating facilities with two new state-of-the-art combined cycle gas turbine (CCGT) units.

The rehabilitation of the Riga CHP-2 power plant is part of local utility Latvenergo's programme to improve the security and reliability of energy supply in Latvia and the Baltic region.



# The art of diplomacy

Last month's climate change meeting in Cancun made notable progress in a number of areas. However, many issues remain unresolved for the next climate conference in Durban, South Africa.

**Yvo de Boer**

Displaying great diplomatic skill, Mexico has brought the UN climate change process back from the brink. After the generally perceived failure of the Copenhagen Climate Change Conference in December of 2009, trust has been restored in the negotiations, important political principles have been captured in a series of decisions, and significant advances made on finance, technology, action to address deforestation and intensified reporting obligations.

Important questions regarding the legal framework for the long term response to climate change remain unresolved and clarity on the future of markets could not be resolved, leaving a significant challenge for next year's climate conference in Durban.

The main sense, however, is that the process has moved forward significantly and that new energy has been injected into the multilateral process.

In the immediate aftermath of Copenhagen, the ability of the UN to deliver on a complex issue such as climate change was called into question. The continuing economic crisis and failure to adopt climate legislation in the US Senate further complicated the political landscape, with many doubting the willingness of nations to aggressively address climate when many key economic issues crowd the international agenda.

Faced with the daunting challenge of picking-up the pieces from the Copenhagen Climate Conference, the Mexican government sensibly set modest expectations and went on to deliver well beyond them.

Major investments were made by President Calderon and Foreign Minister Espinoza and her team, in restoring trust in the process. A series of informal ministerial meetings organised throughout the year and during the conference itself brought political leadership and trust back to the process.

At the same time the Mexican hosts placed their trust in the formal documents under negotiation, rather than coming with its own texts of the kind that created so much suspicion in Copenhagen. These careful efforts were more than rewarded.

Cancun was able to incorporate many key political elements that had been agreed informally in Copenhagen into formal decisions of the conference. The long-term goal to maximise temperature increase to 2ºC is now universally embraced, as is the need to revisit the adequacy of this target in 2015, based on the latest scientific findings.

The commitments to limit and reduce emissions made some 100 countries in the aftermath of Copenhagen are now formally recognised and will be subject to intensified procedures for reporting, consideration and verification.

Financial promises made to assist developing countries in reducing their emissions and adapting to the impacts of climate change have been firmly anchored. Some $30 billion in short term finance for the period 2010-2012, rising to $100 billion per year from 2020 on. New institutions have been created to manage significant portions of this financial flow and to enhance technology deployment, capacity building and national adaptation programmes.

A phased programme to support countries in addressing deforestation has also been launched.

Yvo de Boer: trust has been restored in the negotiations

Important issues, however, do remain unresolved. Many of the institutional frameworks created will have to be fleshed-out over the coming year, subject to final approval in Durban. The future of market-based mechanisms is recognised in principle, but their nature and scope is undecided.

Since current mechanisms reach the end of their mandate at the end of 2012, this lack of clarity will be of major concern to the private sector. Private sector investments are key to a low carbon future. Without clear policies and frameworks, private financial flows will not be mobilised and as a consequence climate goals will remain out of reach. Defining a clear and robust role for markets must be a top priority for Durban.

> Without clear policies and frameworks, private financial flows will not be mobilised and as a consequence climate goals will remain out of reach. Defining a clear and robust role for markets must be a top priority for Durban

The future of the Kyoto Protocol, which bedevilled talks in Copenhagen and continued to do so in Cancun, also remains unclear. Canada, Japan and Russia have made it abundantly clear that they see no future for a treaty that fails to bind the US and major developing countries such as China and India. Developing countries on the other hand have been unequivocal in maintaining that without Kyoto there is no future for a broader regime. This issue will have to be resolved in Durban, if the good progress made in Cancun is to have a real future.

Three possible ways of dealing with this conundrum present themselves. The first – somewhat unlikely option – is to persuade Canada, Japan and Russia that the broader progress made should not prevent Kyoto continuing to exist in parallel to a new treaty. This option is unlikely since it would mean a legally binding commitment for all industrialised nations bar the United States.

A second option would be to ignore stated opposition, launch a second Kyoto period and hope that it enters into force. This option is highly unlikely to succeed, since the without consent of the objecting countries, the necessary trigger for entry-into-force (55 per cent of industrialised country emissions covered) would not be reached.

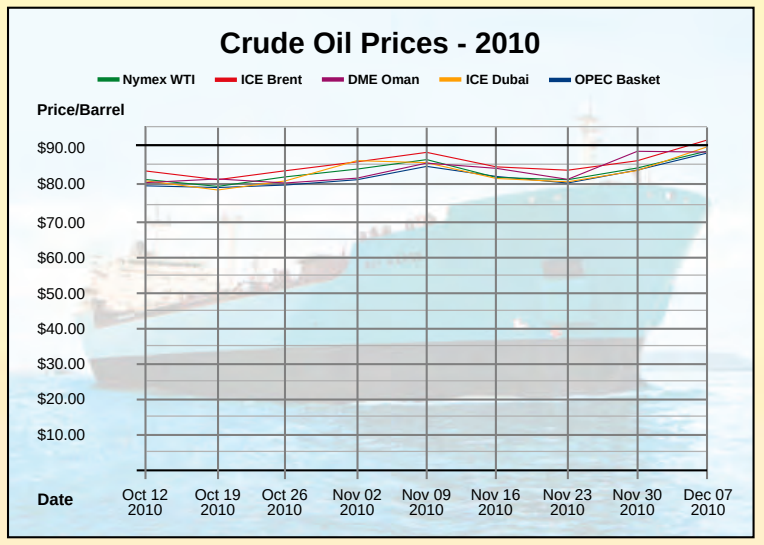
The third and perhaps most promising option is to give such force of conviction to the foundation Cancun has laid, that moving forward with two separate legal instruments is generally seen as meaningless. Getting to this option is no mean feat. In all probability it implies accepting the end of international legally binding commitments since the US will not enter into one without China doing the same and visa versa. This, added to the inadequacy of commitments currently on the table, remains a very difficult bridge for many nations to cross.

South Africa will have to bring all its diplomatic skills to bear if the resurgence seen in Cancun is to be sustained.

*Yvo de Boer is KPMG's special global adviser on climate change and sustainability. Mr De Boer was formerly Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC), facilitating the 2009 climate summit in Copenhagen.*

Oil

# Rising demand boosts prices and concern for global economy




## Opec comfortable with $90/b oil
## Higher prices "risks undermining economic recovery"

David Gregory

Throughout most of 2010, the price of West Texas Intermediate (WTI) crude and the price for the Opec basket have moved within the $70-80/b range – the range considered most favourable for all by Opec heavyweight Saudi Arabia. But since late October, crude prices have begun to move towards $90/b – and ICE Brent has been trading at above that price for several weeks. Market observers are now asking: given that Opec oil ministers expressed little concern about rising crude prices during their recent conference in Quito, Ecuador, how long before the price of crude tops $100/b?

With the world still struggling to come out of a global recession, analysts are beginning to wonder if higher crude prices might choke-off the recovery. Price hawks at the Opec ministers' conference insisted that the world market could tolerate a price of $100/b, or even $120/b. Opec's position is that rising prices are again the work of market speculation and do not expect the price to exceed $100/b.

Speaking to reporters during the Quito conference, Opec Secretary General Abdullah al-Badri said the group was comfortable with $90/b oil and would not increase its production target if the price moved up to $100/b.

"If we go to $100/b because of speculators, Opec will not move," he said. "The price may go to $100/b, but it will come down. A range of $10 up and down is acceptable."

But according to the recent monthly oil market analysis published by the London-based Centre for Global Energy Studies (CGES), the increase in crude prices is being driven by fundamentals, not speculators.

"Opec needs to produce more oil if it wishes to keep prices in the $70-80/b range that, until recently, it regarded as fair," the CGES said in the December issue of its *Monthly Oil Report*. And it warned that Opec's pursuit of higher prices "risks undermining the global economic recovery and damaging the health of the oil market upon which Opec depends."

At the Quito gathering, Opec agreed to leave its production target at 24.845 million b/d for the Opec-11 (excluding Iraq). The Opec-11 produced 26.67 million b/d during November while added Iraqi output brought the total to 29.213 million b/d for the month.

In the December issue of Opec's *Monthly Oil Market Report (MOMR)*, the group acknowledged that market conditions improved during 2010, but said despite a convergence in views that fundamentals are improving, the market is still facing a high degree of uncertainty by the wide divergence in forecasts for world oil demand and non-Opec supply. "Currently," the MOMR said, "forecasts for world oil demand growth in 2011 show a range of 1.0 million b/d to 1.8 million b/d, while non-Opec supply growth projections range from -0.2 million b/d to 0.8 million b/d. These wide ranges make it challenging to assess the real needs of the market."

It added that over the medium and long term, the level of uncertainty is even greater. "In addition to the uncertain direction of the global economy, there is also a lack of clarity over the impact that energy and environmental policies in several major consuming countries will have on future oil demand."

Crude oil demand has grown more than was anticipated at the beginning of 2010. The International Energy Agency (IEA) again raised its forecast for demand for 2010 and 2011. It expects global oil demand to average 87.4 million b/d during 2010, an increase of 2.9 per cent over 2009, while demand for 2011 is forecast to average 88.8 million b/d, up by 1.5 per cent over last year.

CGES disagreed with Opec ministers' assessment that the market is well supplied and that some of the rise in crude oil prices could be attributed to the fall in the value of the dollar. CGES argued that the dollar has actually strengthened against the euro in the last three months and added that its "speculative activity index" was at an all-time low.

It said price rises are being driven by "tightening market fundamentals," noting that global oil inventories were falling and that they were doing so more outside the OECD than inside it. "Without more oil from Opec, global stock cover will continue to fall next year, unless once again demand growth turns out to be very weak."

CGES said Opec members should be raising output now and should be concerned about undermining oil demand growth. "Higher oil prices risk jeopardizing the economic recovery. Unless Opec's sentiment changes, or the global economy slows dramatically once again, the world is set for higher oil prices next year."

Gas

# Qatar marks LNG production target

While the announcement that Qatar will host the 2022 World Cup generated far more excitement, last month Qatar celebrated in Doha the means that has made winning the bid to host the World Cup possible – its giant LNG industry.

Mark Goetz

On December 13, Qatar officially marked its goal of reaching an LNG production capacity of 77 million tons/year with an elaborate ceremony in Doha even though that capacity target will realistically be reached in early 2011. When the emirate achieves this output it will be the largest producer of LNG in the world through its two LNG companies, Qatargas and RasGas. While the Gulf state's crude production is only 900 000 b/d, making it the second smallest oil producer in Opec, Qatar gas, condensate and crude output is now the equivalent of 4.5 million b/d.

Qatar, with the third largest gas reserves in the world, draws its gas supply for its LNG industry from the North Field, which has reserves of 25.45 trillion $m^3$ (900 trillion $ft^3$), making it the largest single gas deposit on earth. Export contracts have been signed with 23 different countries and Qatar has established a reputation as a reliable supplier, with the Qatar shipping company Nakilat operating 54 LNG vessels for transport.

The development of shale gas reserves in the US has played havoc with the international gas market forcing spot prices down. For the most part, Qatar's LNG sales are carried out through long-term contracts in which the price of gas is linked to that of crude. Because Qatar had intended to sell much of its new LNG output to the US, it has had to adjust its marketing scheme and is now more focused on Asia.

Speaking at a press conference following the ceremony in Doha, Qatar's Deputy Prime Minister and Minister of Energy and Industry Abdullah al-Attiyah said Qatar intended to deliver gas to the US market, but that it was increasing its supply of LNG to China and India and was negotiating with other potential customers in Asia. And while there is a large up and coming LNG industry developing in Australia that is due to come into production by the end of this decade, Mr Attiyah expressed confidence that by that time the current weakness in the gas market will have evaporated.

Fearing that the many projects proposed for the North Field might affect pressure in the reservoirs and result in the field's production potential being harmed, Qatar in 2005 declared a moratorium on any further development of the field until an assessment of the field's health could be made. As yet, the moratorium has not been lifted and is expected to remain in place until 2014.

For now, Qatar has a plentiful supply of gas which it intends to use to develop a number of other projects, among them the expansion of its condensate industry, which is not restricted by Opec production quotas. Condensate production is 382 000 b/d and will soon expand to 500 000 b/d.

A 140 000 b/d gas-to-liquids (GTL) plant, built by Shell, is scheduled to soon come on-stream. Qatar is also shipping gas by pipeline to the UAE.

According to Mr. Attiyah there are no further plans to build another LNG facility. Production from the existing plants could be increased through de-bottlenecking and revamping, he said.

Meanwhile, Qatar's success at exploiting the North Field sharply contrasts the efforts of neighbouring Iran, whose offshore territory includes the northern part of the North Field, which Iran calls South Pars.

Qatar began extracting gas from the North Field in 1991 at a rate of 800 million $ft^3$ per day (cfd). By 2015, when all the projects for the North Field are finished and working at full capacity, Qatar will be extracting 25 billion cfd (bn cfd) and will have by that time extracted a total of 60 trillion cubic feet (tcf). Iran's work on South Pars began in 2002. By 2015 its rate of extraction is forecast at 18.9 bn cfd and total gas drawn from the field will be a total 42 tcf.

Iran's concern is that gas is migrating from its side of the gas field to Qatar's. Experts are unable to determine at what rate the gas is drifting. Qatari officials working on the study have been unable to obtain reliable figures from Iran on its plans for future production, preventing an accurate picture of how the field is behaving.

Iran recently announced that it will complete another six of its 24-phase South Pars programme within three years. Most experts believe it unlikely that Tehran will succeed in meeting this deadline.

Doha: Qatar is set to become the largest LNG producer this year

# Financing renewables

The global outlook for renewables is one of growth but a financing gap is threatening targets in various countries. Amplio's **Riccardo Segat** shares his views on the market and financing challenges with *TEI Times.*

As CEO of Amplio Group, an investor in renewable energy projects as well as a developer, Riccardo Segat has first-hand experience of the financial challenges facing the industry.

In its recent *World Energy Outlook* (WEO 2010) the International Energy Agency (IEA) says that $5.7 trillion investment is needed for renewables between 2010 and 2035. It is a huge sum of money – one that raises questions of where it will come from and which technologies will be hard-pressed to raise project financing?

Segat says that the overall outlook for renewables is definitely growth but notes that financing is lagging behind the targets that need to be achieved.

While financing may not be such an issue for cash-rich utilities, life is a lot more difficult for independent developers who rely on access to capital.

"As a private investor, Amplio invests its own equity and has a partner with an asset fund that is looking to build plants across Europe and the US. We are living the frustrations on a daily basis. People are looking for higher returns and debt is not available. You can build projects faster if you go unlevered but if you are looking to build a portfolio on a project finance basis, it is going to take a long, long time," said Segat.

There is plenty of equity available but the cost of equity is an issue. With more projects available than financing and investors looking for higher returns, the result is that there is quite a lot of equity that is not being invested.

The pot for financing in Europe has shrunk considerably in recent years. "Based on conversations I have on a daily basis with different banks, I would say it's about 50 per cent less, if not more, than it was maybe three years ago," said Segat.

At one point in 2009, he noted that none of the banks were taking on new projects – specifically the German and UK banks. But there are signs of recovery, with many banks such as Deustche Bank and Dexia active again, albeit at lower volumes than in the past.

The turnaround is attributed to renewed access to liquidity, even if the credit market is not as buoyant as before the financial crisis. "Clearly the banks are saying: 'funding costs are higher therefore we need to charge a higher spread'. Before the credit crunch, projects were being financed at 100-120 basis points over Euribor [Euro Interbank Offered Rate], it's now a 270 to 330 spread. The good news is that interest rates are quite low, so projects are still viable."

Yet, the scenario of low interest rates is one that may not continue everywhere in Europe due to the volatility related to country debt, especially in countries like Spain and Italy. Segat explained: "Base rates and spreads have been going up significantly in the last couple of months and the cost of borrowing has increased. If we start seeing country debts having an impact on country risk, and interest rates start going beyond the 5-6 per cent threshold, projects start becoming difficult to do because you shrink the return on equity. A 50 basis-point increase can reduce your return on investment by a couple of points, which can change your project from being feasible to not feasible anymore."

The ability to secure financing depends on the technology. Segat observed: "My feeling from speaking to different banks in Europe is that the appetite for financing varies. If you look at the technologies that are commercially viable and scalable, i.e. solar, wind and biomass, access to financing is basically easiest for solar because of the lower volatility of the asset class and the increasingly cheaper cost of the technology. It's probably more difficult for biomass, while wind is somewhere in the middle."

He added: "Asset financing follows the risk-return. Compared to other assets, solar has a very low level of volatility. Assuming they all look for a 15 per cent return, there is a better risk-return ratio on solar than biomass, and again wind is somewhere in the middle."

The solar industry has been helped by a reduction in costs says Segat. "The cost of solar has been falling, driven by the ability of solar panel manufacturers, predominantly in China, to cut costs. If prices had remained at what they were two years, we would probably have no projects. But the solar industry has been able to adapt, which is why we are seeing such high growth rates."

According to Segat, the same cannot be said of biomass. In markets like the UK, developers have to depend on long-term agreements with biomass suppliers that are not based in the UK and therefore have no equity involvement in the project. This makes banks reluctant to provide funding.

The loan-to-value (LTV) for biomass is also much lower than solar and wind – around 65-70 per cent of total cost compared to 80-85 per cent for solar and somewhere in between for wind.

Even within the wind industry, technology type has an impact on the appetite for financing. There is a massive difference between onshore and offshore projects. Segat warned: "Offshore is a business for people with broad shoulders – the large utilities with access to funding that can commit big amounts of money pretty quickly. These projects will always have utilities funding them because their average cost of capital is generally lower than anyone else."

As a developer, a project needs to be divided into three phases: development, construction and operation. Each of these stages could potentially be financed differently since they carry completely different risks.

Project development is a high-risk activity. If a developer does not obtain a permit to build, the value of the project is zero. But there are some basic rules that developers can follow.

Riccardo Segat: People are looking for higher returns and debt is not available

> "… financing is easiest for solar because of the lower volatility of the asset class and the increasingly cheaper cost of the technology. It's probably more difficult for biomass, while wind is somewhere in the middle"

Segat advised: "One of the key rules is to develop a portfolio of projects with differing technologies and in various locations so that if one gets stuck the other can continue. If you can win on one in ten projects, you should be able to recover most of your money."

Whether solar, wind or biomass, much of the financing for project development is likely to be met by private investor. "Money for development is very limited. It will generally come from private sources, people that are prepared to take much higher risk. Venture capitalists may invest in technology but not project development."

During the development stage no debt is needed all that is required is the ability to find the right project and manage relationships with local communities in order to effectively get it through planning applications.

Once a project achieves permitting and moves into construction, Segat says there is then significant financing available, typically from asset funds or infrastructure funds. "During this stage you are generally looking for bigger cheques from institutional investors, primarily asset funds or hedge funds that are willing to take the risk of building inoperable assets."

When the asset is operational the most popular source for financing are infrastructure funds looking for a long-term annuity, or large utilities looking to consolidate their portfolios. Segat noted: "At the point when the project is built, we tend to exit and re-use the cash to develop other projects. We might sell it to a long-term investor such as an infrastructure fund and, if needed, continue to manage the asset though a management agreement. Alternatively, if we sell to a utility, we leave the running of the asset to their internal team."

As an investor, the most critical issue is the unlevered return given the volatility of the asset class as well as the volatility of the unlevered return, which depends on the operational efficiency of the asset. Factors like the reputation and ability of the operator and technology used, e.g. type of solar panel or wind turbine, will all be considered. This also ensures that an investor can extract the maximum amount of cash from the project.

"Issues such as the type of technology are very important from the outset. If you buy a bad turbine, you are stuck with it. Things like that will affect your long-term cash flow. So we spend quite a lot of time assessing value for money and reliability. We use track record and experience to judge a technology.

"Banks are probably better placed than many independent consultants to do this. They have their own internal teams that can say this or that panel is OK or that this turbine is better than the other. They have financed projects in various countries and are perhaps more familiar with operational issues than any other investor. Amplio also has a team internally looking at researching and keeping updated statistics on panel efficiency based on their experience as developer and operator of its own plants," said Segat. Ultimately, the ability of renewables to attract financing will depend on subsidies and the related legislation. Although the long-term goal is the complete removal of subsidies as costs come down, today renewable projects are not viable without them.

The various national approaches to subsidies will determine where investors take their money. Segat commented: "Globally governments are struggling to continue to support renewables. The US will have significant issues. There is more clarity in Europe although each country has its own issues. Spain reduced its feed-in-tariffs (FITs). The UK also introduced FITs for solar but is already talking about when to stop them with only 50 MW installed."

The general outlook for renewables remains positive. Europe remains committed while India and China are two large and growing markets. However, the rate of growth will ultimately depend on governments providing the level of legislative certainty required to attract long-term investment.

# Titan of the sea

The use of superconductors looks set to push the size of wind turbines to 10 MW within the next two to three years, **Junior Isles** reports.

Manufacturers have been steadily increasing the size of wind turbines over the last three decades, from tens of kilowatts in the early 1980s to 5 MW for today's largest offshore machines. The trend towards larger turbines is being driven by economics: taller turbines with larger sweep areas produce more power at a lower cost per kWh.

Increasing the physical size of units is, however, presenting an increasing challenge to engineering, transportation and installation costs.

Now the physical limitations that manufacturers are facing look set to be overcome as a result of the SeaTitan wind turbine project.

SeaTitan, being developed by American Superconductor (AMSC), is an offshore wind turbine that utilises a high temperature superconductor (HTS) ultra-low speed, direct drive generator to produce 10 MW of power.

Jason Fredette, Managing Director of Corporate Communications outlined the economic benefits of this turbine, which is significantly larger than any in production today. "We have done some cost analysis of the entire SeaTitan wind turbine to verify that it will be a cost-effective system in the offshore wind arena," he said.

Compared to a 300 MW offshore wind farm based on 5 MW or 7.5 MW wind turbines, first-cost savings could be easily 20-30 per cent Fredette estimates. He also says that the need for fewer turbines will reduce operation and maintenance costs.

The SeaTitan project is the result of the convergence of two separate developments: AMSC's 2007 acquisition of Austria-based wind turbine design and engineering organisation Windtec GmbH which now forms the company's wholly-owned AMSC Windtec subsidiary, and a programme with the US Navy to develop rotating machines and motors that use superconductors.

Speaking on the origins of the programme, Fredette said: "We've manufactured several systems including a 36.5 MW HTS ship propulsion motor. This went through successful full load testing at the Navy test-bed in Philadelphia about two years ago. We are now using a lot of that knowledge to develop the SeaTitan generator."

The key benefits of using superconductors in the generator are a reduction in size and weight combined with higher performance. While AMSC is initially focused on a 10 MW turbine, units as large as 20 MW are believed to be feasible with HTS technology. The higher power density of an HTS electric machine is made possible by the high field, lossless HTS rotor, which increases the torque for a machine of a given size. This was validated in the Navy ship programme.

Higher power density is especially important in offshore wind farms, which are logistically harder to construct.

Conventional offshore wind turbines rely on increasing blade length and tower height to improve capacity factor. However, as blades get longer, they challenge the ability of designs and materials to support their own weight, withstand wind loads and remain transportable. Taller wind towers can access higher wind speeds but they are more expensive and difficult to erect.

At the same time, gearboxes and bearing components are put under higher stress in offshore wind conditions and have less than optimum lifetimes. There has therefore also been a move towards direct drive machines.

The 10 MW SeaTitan wind turbine is designed to harness average wind speeds of 10 m/s with a rotor diameter of 190 m.

The size and compactness of the SeaTitan generator allows it to be placed directly on top of the tower, which is a big advantage in terms of the load path from the blades to the tower. Compared to standard direct drive machines that have a large generator in front of the tower, AMSC's HTS concept does not require any of the structures that would normally be used for generator support and to counter the torque.

According to AMSC, the SeaTitan wind turbine will offer the highest power-to-weight ratio, reducing the costs associated with the supporting mast structure, foundations, flotation systems and installation.

A "transformational design approach" was undertaken to develop the SeaTitan HTS generator. Utilising AMSC's proprietary HTS Amperium wire, initial optimisations of an integrated wind turbine system were performed under an internally funded AMSC project. A design study for 3-10 MW turbines was completed in parallel, to develop specifications for the HTS polesets, torque transfer system and rotor cooling. This, says AMSC, allows a "tightly optimised band for the generator diameter and length" to compete with existing technologies.

The machine will have a nacelle that is 10 m long by 6 m high, with a combined nacelle and rotor weight that is less than 500 t. AMSC says a conventional direct drive machine, scaled up to the same capacity might require a nacelle 13 m long by 12 m high, weighing 800-900 t. A geared turbine, meanwhile, would likely be topped with a nacelle 13-15 m long and 5 m high, weighing 750-850 t.

AMSC has worked closely with TECO-Westinghouse, a US-based AC and DC motor and generator supplier, as well as the US government to develop some of the technologies needed for the generator.

"Over the past 24 months, we have gone through two programmes with the US Department of Commerce and US Department of Energy to come up with some of the core technologies required for the generator system and to analyse the system from a cost perspective," said Fredette.

To date, the company has developed designs for the wind turbine and the superconductor generator system. So far, subsystems have been built, along with superconductor coils and portions of the rotor.

A full generator prototype has not been built yet but that is one of the next steps in the project. One of the key challenges going forward is to ensure that the whole supply chain is aligned.

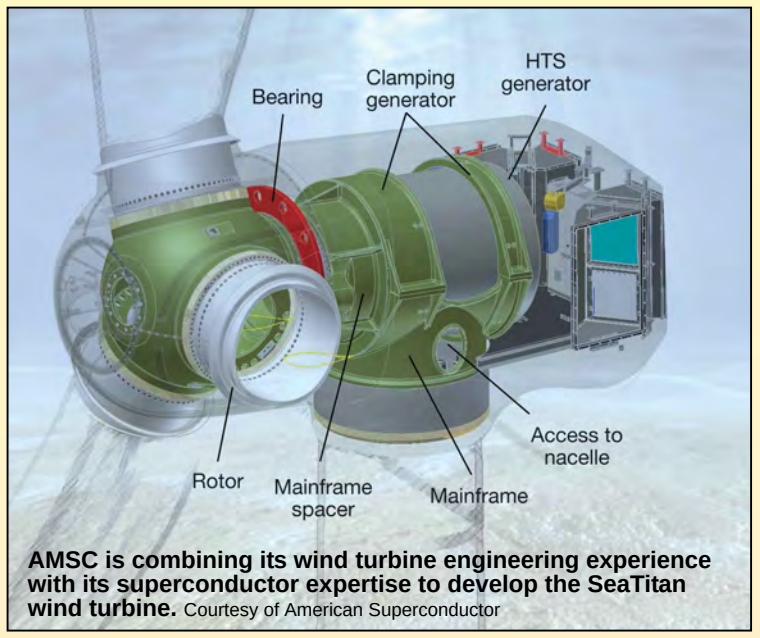
Fredette noted: "It's not just the superconductor generator that's needed. We need longer blades, and we recently took a minority ownership position in a UK company called Blade Dynamics. They will bring us unique blade technology that is much lighter and can be scaled to longer lengths."

AMSC Windtec will need to work with companies like Blade Dynamics and licensees to make SeaTitan a reality. It says it is working with around a dozen wind turbine manufacturers around the world.

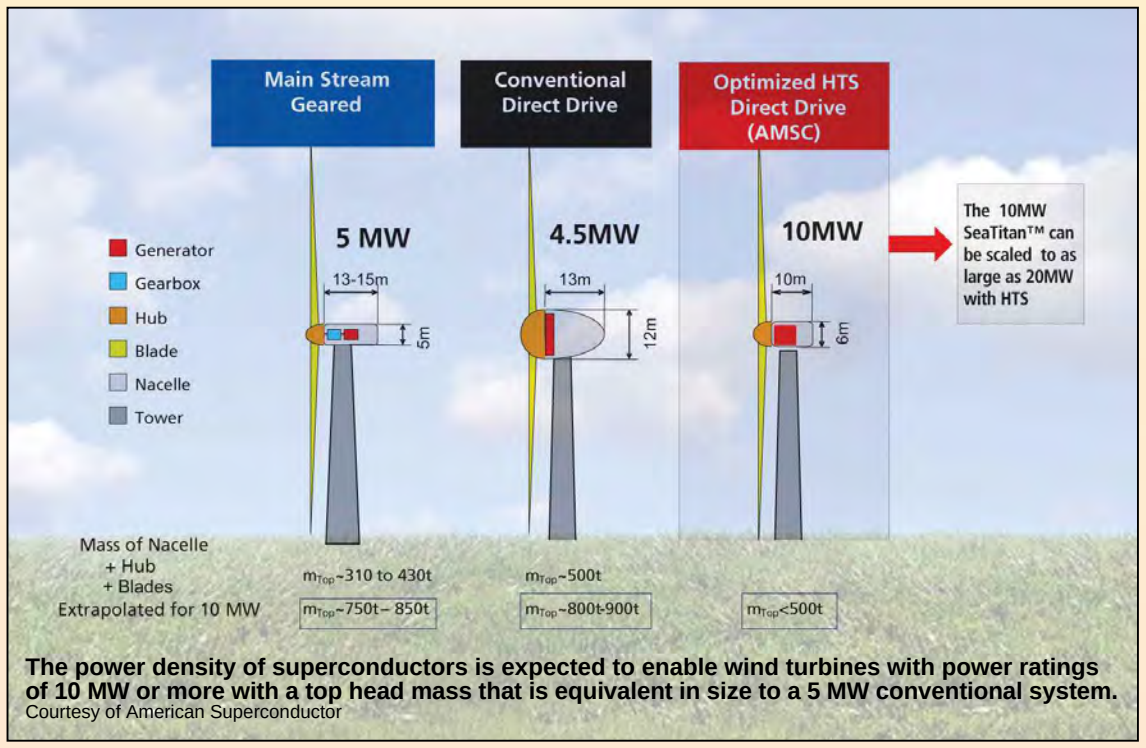
The company is now in the licensing phase. It is currently in discussions with potential licensees around the world, and hopes to announce its first licensee within a year.

Fredette added: "At AMSC Windtec, we intend to provide some exclusivity to licensees, whether it be certain geographies, certain power ratings etc. These are the kind of negotiations we are currently going through."

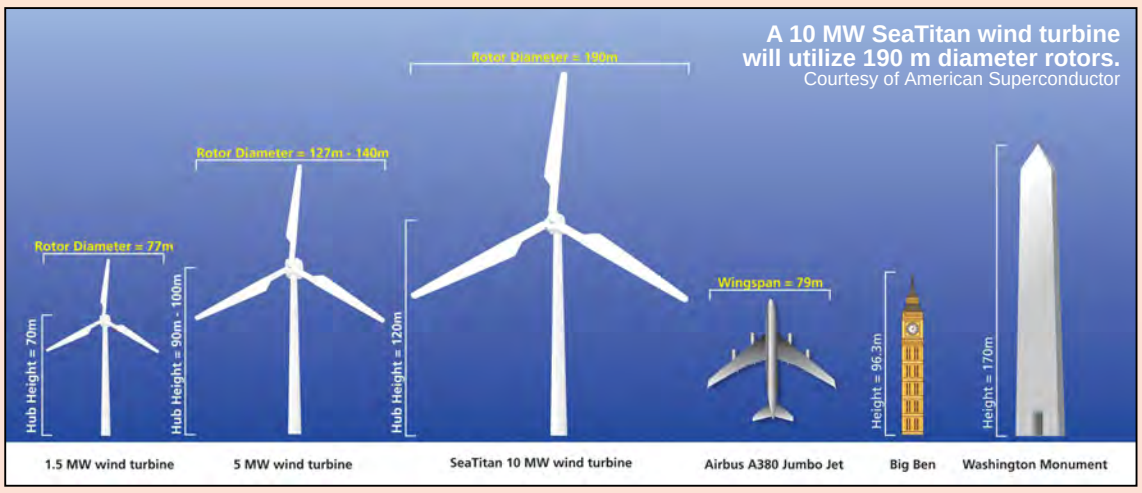
Once the licensee is onboard, the programme will enter the prototype phase, with the goal of having the first prototype up and running some time in 2013. Full-scale production is expected by the middle of the decade. Fredette concluded: "This is when demand for these large offshore units will really start building."




**AMSC is combining its wind turbine engineering experience with its superconductor expertise to develop the SeaTitan wind turbine.** Courtesy of American Superconductor




**The power density of superconductors is expected to enable wind turbines with power ratings of 10 MW or more with a top head mass that is equivalent in size to a 5 MW conventional system.**
Courtesy of American Superconductor




**A 10 MW SeaTitan wind turbine will utilize 190 m diameter rotors.**
Courtesy of American Superconductor

Junior Isles

# Oh, what a tangled web we weave…

The UK has always seen itself as a pioneer in the electricity industry. It was among the first to privatise the electricity market some 20 years ago, leading the world in the great liberalisation experiment.

The public was led to believe it would result in greater market efficiency and lower electricity prices. In 2011 we know differently. Whether the government or anyone knew what the end result would be, but went ahead anyway, is a moot point. What we do know, however, is that there is no turning back. Or is there?

Two decades later, another proposed set of sweeping reforms, which signify a new, more planned approach, has some questioning whether the proposals represent a reversal of a policy set out in the late 1980s.

Today the government tells us the reforms are to meet a new overriding mandate that it did not have 20 years ago – developing a low carbon generation mix while ensuring secure electricity supplies. The question is: can it do what it is designed to do?

To achieve its goal of plugging a looming energy gap while increasing the level of low carbon generating sources – including renewables, nuclear and coal with carbon capture and storage (CCS) – the government has to create the right framework for investment.

It has therefore set out proposed reforms in two consultation documents, one on electricity market reform by the Department of Energy and Climate Change (DECC) and one on the carbon price floor, by the Treasury. The consultations are set to last until spring when recommendations will be published in an energy White Paper.

The UK has committed to some ambitious targets. It has pledged to get 15 per cent of its energy from sustainable sources by 2020 and reduce $CO_2$ emissions by 80 per cent compared with 1990 levels by 2050. Achieving this would require up to 40 GW of low carbon projects, according to a report last month from the Committee on Climate Change.

Commenting on the electricity market reform consultation, Andrew Horstead, Risk Analyst at energy and carbon management specialist Utilyx said: "The UK currently faces an energy 'trilemma', trying to balance security of supply, affordability and sustainability and something has to give. With so much traditional power going offline, security of supply has to be the government's priority otherwise we could see the lights go off."

He added: "The consultation has the power to undo the last 15 years of free market principles and is a bold move from a government that is trying to be the greenest government ever. The government must guarantee prices for electricity if it is to persuade the private sector to invest in low-carbon and renewable forms of generation. Without this, it will be impossible to hit our 2020 and longer-term 2050 targets."

Energy secretary Chris Huhne argued, however, that a new more centrally planned approach does not run counter to free market principles, claiming that it is "building on the vision" set out by the Conservative energy secretary, Nigel Lawson over 20 years ago.

He said: "We decided to make sure we take into account the market, of the enormous cost to society of carbon emissions. It is a market approach and will encourage new market entrants as well as the best possible deal for consumers.

"[The reforms are] a far cry from all the intervention you could have, like a regulated asset base, and a fixed rate of return."

"...setting a long term price for emitting $CO_2$ is an essential tool to get investment in low carbon generation. However, the GB market is going to become probably the most complicated in the world."

Certainly the last part of this statement is true but as for it encouraging the "best possible deal for consumers" really depends on how you interpret the word "best". 'Joe Public' could be forgiven for thinking it means cheap, clean electricity. Certainly it will not mean cheap.

David Porter, Chief Executive of the UK Association of Electricity Producers said: "The current electricity market delivers competitive prices for customers and it has kept the lights on for the past 20 years. But, the political emphasis on how we generate electricity has changed during this time and this market reform document focuses on supporting power stations which emit low levels of carbon dioxide, including new nuclear, renewable energy and fossil fuels with carbon capture and storage.

"If we just wanted competitive prices and security of supply, we could probably continue as we are. But, now that the government is ever more serious about reducing carbon emissions, it needs extra levers to pull… Politicians and the regulator seem to recognise that the huge cost of doing this will push up customers' bills. Everyone involved has to be candid about that. Just as important is that we should make sure that we do not completely lose sight of the benefits that a competitive market delivers for customers."

The government may or may not be concerned with customer benefits, which in any event are often questionable. What is certain, however, is that it is a tangled web of rules and incentives that are being proposed to meet the said goals.

Redpoint Energy, the specialist energy consultancy, worked with DECC to specify and assess policy options based on commitments set out by the government in the Coalition Agreement. The report concluded that, if designed appropriately, all the options could meet an illustrative carbon intensity target of 100 g/kWh by 2030 under DECC's central assumptions.

Commenting on the complexity of the proposed reforms, Director and energy expert, Boaz Moselle of global economic and consulting firm, LECG noted: "Some of the new proposals are good news: setting a long term price for emitting $CO_2$ is an essential tool to get investment in low carbon generation. However, the GB market is going to become probably the most complicated in the world.

"It will have a carbon trading scheme (EU ETS), and a carbon price scheme (just announced) and a low-carbon price scheme (also just announced, the new feed-in tariffs) and a carbon tax (the CCL), as well as capacity payments and extra payments for CCS, and new rules on carbon emissions on top of existing EU rules. Renewable generation has the renewables obligation and feed-in tariffs, as well as technology-specific support schemes. It's hard to imagine that government can manage all these instruments to get a sensible joined-up policy. The risk of unintended consequences is high."

He said that for 2011, the government should look to get rid of some of these schemes. "A good starting point would be to simplify the renewables policy, and reduce the overall level of support for renewable generation. It follows what other EU countries are doing, in particular Spain, which can no longer afford to throw money at some of the most expensive solutions around to our energy problems. If we are going to persuade the rest of the world to work with us on global climate, we have to show it is affordable."

When the UK decided to liberalise the electricity market 20 years ago, none of us were told to expect higher prices.

This time around at least the government is honest enough, or at least sufficiently knowledgeable, to warn end consumers that there will be a financial burden. The proposals are numerous and complex and may or may not achieve the claimed goals. Yet although it may be a tangled web the government weaves, at first it seems there is no practice to deceive.

*"... Yes darling, this is one of those new green-multi-tariff-supplier electricity bills..."*